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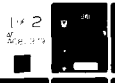

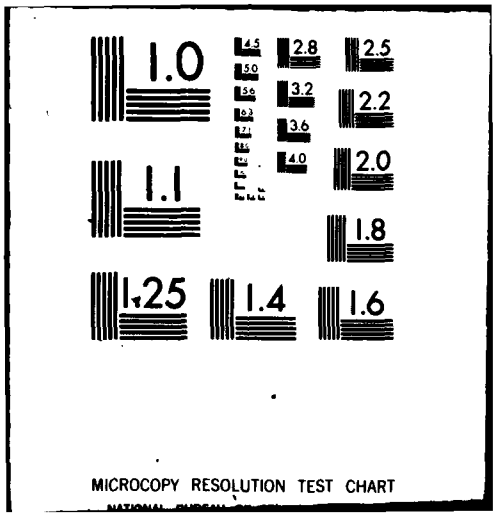
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# LOGISTICS STUDIES OFFICE





LSO PROJECT 911

## OMA P7M FUNDING POLICIES AND THEIR APPLICATION WITHIN THE DARCOM DEVELOPMENT COMMUNITY

DECEMBER 1979

U.S. ARMY
LOGISTICS MANAGEMENT CENTER
FORT LEE, VIRGINIA

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

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# OMA P7M FUNDING POLICIES AND THEIR APPLICATION WITHIN THE DARCOM DEVELOPMENT COMMUNITY

LOGISTICS STUDIES OFFICE

PROJECT NUMBER 911

FINAL REPORT

DECEMBER 1979

BY

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ABSTRACT

It is the policy of the Department of Defense (DOD) that research and development (R&D) organizations shall use the R&D appropriations to finance their operations. Headquarters, DARCOM has discovered a significant number of personnel spaces on the authorized manning tables of DARCOM R&D organizations which are funded using other than R&D monies. The purpose of this study is to determine whether the number of directly-funded OMA maintenance positions authorized to DARCOM materiel development commands (MDCs) are in consonance with and justified by existing budget policy guidance. The study concludes that the use of OMA maintenance funds by development activities may be within the purview of guidance policy. Regulatory documents state a) certain engineering/ laboratory functions will be performed by the MDC on all equipment systems regardless of where they are in the life cycle, and b) these functions may be funded using the operations and maintenance appropriation. However, the study team recommends that any such effort performed by a MDC on a system already transitioned (i.e., under the management control of a readiness command) be on a reimbursable basis.

REPORT TITLE: OMA P7M Funding Policies and Their Application Within The DARCOM Development Community.

STUDY NUMBER: LSO 911.

STUDY INITIATOR AND SPONSOR: Office of the Comptroller (DRCCP-BP), US Army Materiel Development and Readiness Command

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## EXECUTIVE SUMMARY

I. Authority for the Study. This study was initiated in response to the DARCOM tasking letter, DRCPA, dated 21 May 1979, subject: P7M Maintenance Services Personnel Spaces in AVRADCOM.

II. Problem Statement. It is the intent of Congress and the policy of the Department of Defense (DOD) that all costs associated with the research and development of a weapons system-- to include a proportionate share of the attendant administrative and installation support costs--be funded using the Research, Development, Test and Evaluation (RDTE) appropriation. Evaluation of the Tables of Distribution and Allowance (TDAs) of the material development commands (MDCs) indicates that a significant number of personnel are directly funded by the MDC with Operation and Maintenance, Army (OMA) monies rather than RDTE funds. More specifically, the Maintenance Directorate of Headquarters DARCOM questioned the propriety of this funding.

III. Objective. This study was undertaken to determine when the MDCs, to include assigned Project/Program Managers (PMs), are justified in expending OMA Program 7 Maintenance (P7M) funds. The study directly supports the DARCOM Management Objective MG-5, Strengthen the DARCOM resource justification process.

IV. Limits and Scope. The study required an analysis of budget policy and guidance at the DOD, Department of the Army (DA), and DARCOM levels and an analysis of how the DARCOM MDCs are interpreting

and implementing the guidance. The investigation is limited to three specific subelements of OMA P7M monies; these are cost codes 738017.000P3/Q1/Q3. Further, the study is limited to examination of directly-funded personnel spaces paid with these monies.

V. Methodology. The study was undertaken in two phases. The initial step consisted of searching policy and guidance documents, starting with the Congressional Record and continuing through selected pertinent reports, manuals, instructions, and regulations at DOD, DA and DARCOM levels. Guidance was found to be divided into categories; these were discussions of functions (e.g., item development, procurement, reconfiguration, value engineering, etc. actions) and how the functions should be funded versus discussions of who should perform the functions. The second stage of the study consisted of visits to three MDCs--Missile Research and Development Command (MIRADCOM), Aviation Research and Development Command (AVRADCOM), and Tank-Automotive Research and Development Command (TARADCOM)--to determine how these DARCOM commands interpreted and implemented the guidance provided to them. Following that, an analysis of the information and data collected was undertaken.

VI. Findings.

A. The intent of Congress and of DOD policy is that all research and development activity be funded by RDTE appropriations. A system is considered to be under development until it reaches the point where it has been type classified, has a complete technical data package (TDP) and is ready to be produced. Additionally, higher level guidance is

that any improvement which increases the performance envelope of a system, regardless of the life cycle phase of the system, will be RDTE funded. Any other effort expended on a system after development is complete will not be RDTE funded.

B. Higher level guidance (DOD and above) speaks directly to the types of functions to be funded by each appropriation and not directly to the type of organization (MDC versus Materiel Readiness Command (MRC)) which performs the functions.

C. DARCOM guidance and intraservice support agreements between an MDC and its related MRC define the types of functions to be performed by the MDC and MRC. Some functions currently performed by MDC elements as a result of the DARCOM guidance are of the types that are to be OMA or PA, rather than RDTE, funded.

D. DARCOM guidance stresses that no matter who performs a function, the command having management control over a system shall budget all programmed requirements for that system.

E. A divergence exists between the MDCs in procedures for budgeting of personnel resources for OMA-funded functions. In all cases, spaces are identified on the MDC TDAs; however, in some cases, the spaces are directly-funded by the MDC; in other cases, the spaces are reimbursable from the MRC to the MDC.

F. AR 37-100-XX and DARCOM Supplement 1 thereto, the primary source documents for use by the DARCOM major subcommands in determining fund propriety, are subject to differing interpretations by the subcommands.

G. The definition of cost code 738017.000P3 in AR 37-100-80 is interpreted by some MDCs as authorizing the expenditure of OMA funds during system development.

H. Similar engineering/laboratory functions performed by the MDCs in support of fielded systems are funded under different P7M cost codes. For such functions, MIRADCOM uses cost code 738017.000Q1 whereas AVRADCOM uses mainly 738017.000Q3.

I. The three Army Plant Representative Offices (ARPROs), whose primary function is contract administration, are staffed in part with personnel spaces funded from cost code 738017.000Q3.

J. Two interpretations of the term "Technical Data Package (TDP)" are used within DARCOM. The AR 310-25 definition confines the TDP to the documentation for use in procurement whereas the DARCOM Supplement 1 to AR 37-100-XX describes TDP as including all documentation needed to support an item throughout the life cycle.

VII. Conclusions.

A. Per higher level guidance, certain functions performed by the MDCs in support of fielded systems are properly funded by P7M. However, there should be consistency between MDCs as to whether these functions are directly funded or reimbursable. Since such effort concerns fielded systems only, and in consonance with the DARCOM guidance, reimbursement rather than direct funding seems appropriate and would help insure no expenditure of P7M funds during the system development cycle.

B. The definition of cost code 738017.000P3 in AR 37-100-80 can be interpreted to authorize the expenditure of OMA funds during the conceptual (i.e., development) and acquisition phases of the life cycle for specific systems; these funds, however, should be spent by the MDC only in support of general maintenance concepts not related to a specific item of equipment as specified in summary code 738017.000PO.

C. Two steps would serve to reduce divergent interpretations of regulatory guidance within the DARCOM. These are:

1. Consult with representatives of the materiel development commands, determine whether the divergency of regulatory interpretation is due to misinterpretation or organizational requirements, and, insofar as feasible and desirable, standardize the interpretation of P7M budget guidance.

2. Develop specific guidance focused on maintenance support activities in relation to fielded equipment performed by the MDCs and publish it in the DARCOM supplement to AR 37-100-XX.

D. Personnel spaces in the Army Plant Representative Offices (ARPROs) might be more appropriately funded by cost code 721113.20000 (Contract Administration Operations) than by cost code 738017.000Q3.

VIII. Recommendations. It is recommended that:

A. The definition of cost code 738017.000P3 in AR 37-100-80 be examined for conformance with higher level guidance and clarified so as to avoid differing interpretations.

B. Consideration be given to the feasibility of funding the OMA-type functions performed by the DARCOM MDC in support of fielded systems on a reimbursable basis from the MRC, rather than direct-funding by the MDC.

C. Develop and publish in the DARCOM Supplement 1 to AR 37-100-XX specific guidance focused on the use of OMA P7M monies within the MDCs.

D. Consistency be achieved between the MDCs in the use of cost codes 738017.000Q1 and 738017.000Q3.

E. Certain personnel spaces in the Army Plant Representative Offices be funded from cost code 721113.2 rather than from cost code 738017.000Q3.

F. A single definition of "Technical Data Package" be utilized throughout DARCOM.

## MAIN REPORT

1. Background. The purpose of this study is to investigate the use of Operation and Maintenance, Army (OMA) Program 7M (P7M) personnel funding resources within the materiel development commands (MDCs) and their project management offices (PMOs) of the US Army Materiel Development and Readiness Command (DARCOM), and to establish the criteria and rationale for the use of those resources. The problem was surfaced during a routine staff visit to the US Army Aviation Research and Development Command (AVRADCOM) by a HQ DARCOM maintenance management analyst in February 1979. The analyst discovered what seemed to be an unjustifiably large number of personnel who were directly funded with P7M funds. The OMA funding question was therefore presented to the Office of the Comptroller, which then sponsored this study to determine under what circumstances the DARCOM development commands are justified in expending OMA P7M funds. The scope of the problem is indicated in Table 1. These data were provided by the study sponsor at the onset of the investigation and were extracted from the FY 79 TDAs. (Field visits revealed some variances from these figures. The differences are attributable to the addition of some PMO data to the MDC headquarters strengths indicated in Table 1 and to the fact that some TDA changes have occurred.)

2. Objectives. The objectives of the study are:

2.1 To determine Department of Defense (DOD) policy governing the use of OMA P7M (maintenance) resources (personnel and funds) throughout the materiel life cycle.

TABLE 1

SUMMARY - FY 79
DARCOM MAJOR SUBORDINATE R&D COMMANDS
HEADQUARTERS TDA'S
CIVILIANS AUTHORIZED

| COMMAND | GRAND TOTAL | RDTEA | BASE OPS | PAA | FIMA | TOTAL OMA | OPERATION AND MAINTENANCE, ARMY | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 721112 | 721113 | 728011 | 728012 | 732207 | 738017 | 951214 |
| ARRADCOM | 5,136 | 3,348 | 609 | 742 | - | 437 | - | 230 | 54 | 131 | - | 20 | 2 |
| AVRADCOM | 592 | 298 | - | - | - | 294 | 9 | 156 | - | 28 | - | 101 | - |
| CORADCOM | 577 | 326 | - | - | - | 251 | 28 | 138 | - | 58 | - | 27 | - |
| ERADCOM | 287 | 192 | - | - | - | 95 | - | 84 | 8 | - | - | 3 | - |
| MIRADCOM | 1,544 | 1,071 | - | 194 | - | 279 | - | 213 | - | 13 | - | 53 | - |
| MERADCOM | 1,199 | 962 | - | - | - | 237 | - | 15 | 6 | 170 | - | 46 | - |
| NARADCOM | 1,097 | 823 | - | - | 3 | 271 | - | 5 | - | 265 | - | - | 1 |
| TARADCOM | 794 | 493 | - | - | - | 301 | 4 | 121 | 9 | 109 | 7 | 51 | - |
| TOTAL | 11,226 | 7,513 | 609 | 936 | 3 | 2,165 | 41 | 962 | 77 | 774 | 7 | 301 | 3 |

2.2 To analyze Department of the Army (DA) and DARCOM documents implementing DOD policy to determine whether they are clear and in agreement with the DOD policy and with each other.

2.3 To determine how DOD policy and implementing DA/DARCOM guidance are interpreted and applied in the DARCOM Materiel Development Commands (MDCs) and their Project Management Offices (PMOs).

2.4 To report findings and recommend a course of action based upon an analysis of the information and data collected.

3. Limits and Scope. This study consists of an analysis of DOD, DA, and DARCOM funding and life cycle management policy and guidance and the application of the policy and guidance to three specific directly-funded subelements of OMA P7M program element 738017.

3.1 The subelement definitions are summarized below; the complete AR 37-100-80 definitions are included at Appendix A.

3.1.1 738017.000P3: Organic Maintenance Engineering Services (Pre-Issue). Provides for maintenance engineering performed during conceptual and acquisition phases to assure maintenance readiness of equipment. Includes maintenance engineering relative to reliability and maintainability criteria and specifications requirements; development of maintenance concepts; maintenance support planning; maintenance value and human engineering analysis of materiel, etc., prior to issue to the user. (Annex 1, Appendix A.)

3.1.2 738017.000Q1: Organic Field Support Maintenance Engineering Services. Provides for maintenance engineering relative to fielded

equipment. Includes analysis of proposed design and engineering changes related to safety and maintenance of equipment; engineering and technical analysis of field reports pertaining to materiel; engineering performed to correct deficiencies or malfunctions occurring after completion of weapon/support systems production; etc., excluding production engineering provided for under the procurement appropriations and engineering effort which is properly the responsibility of RDTE. (Annex 2, Appendix A.)

3.1.3 738017.000Q3: Organic Other Engineering and Analysis Services. Provides other maintenance engineering and analysis relative to fielded equipment not covered under engineering activities in Q1 above. Includes maintenance engineering relative to economical repair limits; quality assurance and procedures; engineering of items and components to reduce materiel, production and maintenance costs; reclamation and fabrication procedures and techniques; parts reduction, parts interchangeability and substitution analysis; parts and materiel identification; DOD standardization actions, etc. (Annex 3, Appendix A.)

3.2 Directly-funded TDA personnel spaces are those which are programmed and budgeted for by the using command. This study is directed primarily to an investigation of those TDA spaces of the MDCs which are directly funded, using the cost codes identified in the preceding paragraphs, rather than MDC personnel expenses which are reimbursed.

4. Methodology. The study was undertaken in two phases. The initial step consisted of reviewing policy and guidance documents starting with

the Congressional Record and continuing through selected pertinent reports, manuals, instructions, and regulations at Department of Defense, Department of the Army, and DARCOM levels. A listing of all documents perused is at Appendix D. The second stage of the effort was a visit to three major development commands--Missile Research and Development Command (MIRADCOM), Aviation Research and Development Command (AVRADCOM), Tank-Automotive Research and Development Command (TARADCOM)--to determine how the DARCOM major subordinate commands interpreted and implemented the guidance provided to them.

5. Document Search. The document search to determine the guidance to and within DARCOM is summarized as follows:

5.1 A careful reading of the Congressional Record of testimony pertaining to the FY 79 DOD appropriation clearly indicates that it is the intention of Congress that all costs associated with research and development are to be borne by the Research, Development, Test and Evaluation (RDTE) appropriation.

5.1.1 This is emphasized in a report which the House Committee on Appropriations submitted to the whole House to explain the FY 78 DOD Appropriation Bill (House of Representatives Report No. 95-451, 21 June 1977). The report states that:

> "The military departments continue to persist in their efforts to inappropriately budget funds for tasks and programs that are clearly research and development in nature. ... In the considered view of the Committee, any tasks designed to product improve or to increase the producibility, reliability, maintainability, and availability of weapons and

> and equipment are a function of the research and development program.... If subsequent to the deployment of weapons...improvements are necessary...such improvements should be a normal function of the research and development community."

An extract of this report is at Annex 1, Appendix B.

5.1.2 Testimony of senior DOD officials would seem to subscribe to the Congressional intention.

5.1.2.1 Testimony of Mr. John R. Quetsch, Principal Assistant Secretary of Defense, Comptroller, before the Senate Appropriations Committee included the following quote extracted from the record:

> "As a general rule, RDT&E appropriations fund all costs associated with getting defense weapon systems to the point where they are acceptable as operational systems."

Mr. Quetsch's full statement is at Annex 2, Appendix B.

5.1.2.2 Dr. William J. Perry, Under Secretary of Defense for Research and Engineering, was asked during the FY 79 DOD Appropriations Hearings to explain and justify the continued use of Procurement Appropriation (PA) rather than RDTE funds to improve the product or increase producibility, reliability, maintainability, or availability. Dr. Perry stated that it is not possible to identify and correct all potential problem areas during R&D, and that many problems are introduced because of faulty materials or incorrect manufacturing and/or maintenance procedures. He expressed the opinion that to apply R&D funds to the resolution of these types of problems would not be cost effective. (A pertinent extract of the House hearings is at Annex 3 of Appendix B.) Dr. Perry thus delineates two categories of product improvements, those to correct faults introduced

because of faulty materials or incorrect manufacturing/maintenance procedures versus those to otherwise improve the product and thereby increase its performance envelope. In his opinion, the two kinds of improvements merit different kinds of funding.

5.2 The DOD Budget Guidance Manual (DOD 7110-1-M) provides funding guidance to the military departments. Annex 4, Appendix B, contains pertinent paragraphs extracted from the RDTE chapter of the document. The essence of the extracted paragraphs, which pertain primarily to policy, criteria, and definitions, is stated below:

5.2.1 RDTE appropriations will provide (among other costs) for the:

5.2.1.1 Costs of RDTE activities performed by contractor or government organizations, including procurement of equipment and materiel required.

5.2.1.2 Costs of operation of R&D installations:

5.2.2 All RDTE related effort should be funded in the RDTE appropriation so that programs can be assessed from a priority standpoint. Grey areas are to be resolved in favor of using RDTE funding.

5.2.3 Among the types of costs that are to be funded with RDTE appropriations are:

5.2.3.1 The conduct and support of R&D, including activities starting with basic research and continuing through advanced development; any supplies or equipment purchased and/or consumed in the R&D process are included.

5.2.3.2 Expenses and investments for the operation and maintenance of R&D organizations, facilities, installations, and activities (including those operated by contract) which are engaged in RDTE programs, including those primarily engaged in the management, administration, or the direct support thereof.

5.2.4 Among the types of costs to be financed by other than RDTE appropriations are:

5.2.4.1 "Acceptance, quality control and surveillance testing of articles obtained for other than R&D purposes." (Para 251.4B4a)

5.2.4.2 Management studies and applications of management sciences to improve organizational effectiveness are to be financed from the O&M appropriations.

5.2.5 A number of "special situations" are addressed in the DOD Budget Guidance Manual. The only special situations that impact on this study concern: a) "product improvement" of major end items and major components of major end items (except for aircraft engines), and b) aircraft engine improvement (called "component improvement"). "Product improvement" funding of items in production or in the operational inventory depends on whether or not the current performance envelope is increased; if it is, RDTE funding will always be used. When the performance envelope is not increased, PA funding is used if the system is in production, and O&M funding is used if the system is no longer in production. "Component improvement" of aircraft engines is funded by RDTE except for the case where the engine has reached initial production

suitability and the improvement does not increase the performance envelope; in this case, PA funds will be used.

5.3 The basic funding guidance document published by Department of the Army is AR 37-100-XX, The Army Management Structure (AMS). The last two digits of the document number change with each fiscal year; the current regulation is numbered AR 37-100-80. This AR implements the guidance published in the DOD Budget Guidance Manual, and the provisions set forth in the DOD document are repeated in the AR.

5.3.1 The Army regulation expands and explains the DOD guidance in greater detail than is found in the Budget Guidance Manual. Pertinent information found in the AR but not in the DOD Budget Guidance Manual is summarized below; the complete extracts are located in Annex 5, Appendix B.

5.3.1.1 Under types of costs to be funded by the RDTE appropriation are listed the accumulation of data on items under development for manuals and equipment publications, new equipment training, training of test personnel, logistic support analysis, and evaluation of logistic support elements.

5.3.1.2 Producibility Engineering and Planning (PEP) measures will be funded by the RDTE appropriation if undertaken prior to quantity procurement.

5.3.1.3 Studies and analyses that support R&D activities will be funded by the RDTE appropriation; if it is unclear that the study/

analysis supports R&D activities but the sponsoring organization is a R&D staff level headquarters, RDTE funds will be used. All other studies and analyses will be O&M funded.

5.3.2 AR 37-100 contains the definitions of budget cost codes. Cost code 738017.000P3, Organic Maintenance Engineering Services (Pre-Issue) is addressed in this study. The first sentence of its definition reads:

> "Provides for maintenance engineering performed during conceptual and acquisition phases."

(See Appendix A, Annex 1.) This cost code seemingly violates the clearly stated intention of Congress that the RDTE appropriation fund all costs associated with research and development. It also appears to run counter to DOD budget guidance policy which reiterates the Congressional stand and states that in cases which are not clear-cut the RDTE appropriation is to be used. The summary cost code definition (738017.000PO) states that the monies are for centrally-managed maintenance programming and planning support. Policy statements in AR 37-100-80 include the following:

> "The costs of developing general maintenance concepts, content, formats, etc., that are not oriented towards a specific item of hardware but may be included, if needed, in any maintenance support material or equipment publication, will be charged by the NMP to OMA (738017.000PX)..."

It may have been intended that the P3 cost code would be restricted to the general concept development function of the National Maintenance Point (NMP) of the MRC; if so, that intention is not conveyed by the cost code definition.

5.4 DARCOM Supplement 1 to AR 37-100-XX amplifies and/or clarifies guidance contained in the AR. Paragraph 2-3 of the supplement to AR 37-100-80 is entitled "Selected Funding Guidance"; it contains several statements impacting the expenditure of RDTE, PA, and OMA funds. Extracts of pertinent statements found in the DARCOM supplement are at Annex 6, Appendix B. A summary of each follows:

5.4.1 Value engineering is a program which aims to improve the cost effectiveness of a system. RDTE funds will be used for value engineering except for those systems in production or in inventory whose performance envelope is not being increased; the latter systems will be funded with PA or OMA funds, depending on the prime benefiting program.

5.4.2 Program/Project/Product Manager's expenses can be charged to RDTE, PA, or OMA. The proper appropriation depends on whether items are in RDTE or in production; and if in production, which type functions are being performed. For items in RDTE, RDTE funds are appropriate; for items in production, production engineering type tasks will be PA funded whereas tasks such as contract administration, central supply, and maintenance engineering will be OMA funded.

5.4.3 Effort in support of a technical data package (TDP) can be financed with RDTE, PA, or OMA funds, depending on the current phase of the life cycle, the reason for the TDP change, and the item type (investment (PA) or expense (stock fund)). It is noted that the DARCOM supplement considers the TDP to include all documentation needed to

support an item throughout the life cycle and not simply the documentation needed for procurement purposes.

5.4.3.1 If the system is under development, RDTE funds will be used for documentation efforts. Once the item has been adopted/type classified, PA or OMA funds will be used except for the single case of RDTE fund usage when documentation changes result from a reconfiguration and the first phase reconfiguration was RDTE funded. Documentation changes on adopted/type classified investment items will be funded by PA if the item is in production and by OMA (P7M) if the item is no longer in production. Documentation changes on adopted/type classified expense (stock fund) items will be funded from OMA (P7S) whether in or out of production.

5.4.3.2 There appears to be only one situation where the particular subelement (Q1 or Q3) funds under study here might be authorized for use in documentation efforts. This is when changes to equipment documentation are necessitated by a reconfiguration action and 738017.000QX funds had financed the first phase reconfiguration effort as a result of the item being out of production.

5.5 Following the decision to divide DARCOMs commodity commands into development and readiness commands, HQ DARCOM (DRCPA-O), published Letters of Instruction (LOIs) to each of the newly activated organizations. Each letter is essentially identical; pertinent extracts of the letter to AVRADCOM/TSARCOM are appended at Annex 7, Appendix B.

5.5.1 This LOI directs that the MDC will provide the following support to the MRC: Under the section pertaining to procurement and

production, AVRADCOM (MDC) will continue to provide engineering support after an item has been transitioned, as tasked by TSARCOM (MRC). In the product assurance section, AVRADCOM is tasked to provide laboratory support to TSARCOM for any in-house conducted post-production tests. Air worthiness, design integrity, and currency of the TDP will remain the responsibility of the AVRADCOM throughout the item life cycle. The AVRADCOM/PM retains planning and scheduling responsibility for publications throughout the materiel life cycle but TSARCOM is responsible to prepare, acquire and maintain equipment publications.

5.5.2 The LOIs state:

> "It is imperative that all who would understand this policy document note carefully that it keys not on who performs the function or even particularly where the function is performed, but who is responsible for managing the item."

And, the LOIs direct that the MDCs shall budget for all programmed requirements prior to the transition of an item to the MRC, and the MRC shall budget all programmed requirements thereafter.

5.6 A discrepancy in interpretation of the term TDP exists between the DA definition and the description found in DARCOM Supplement 1 to AR 37-100-XX. The Dictionary of US Army Terms (AR 310-25) defines TDP narrowly, limiting the package to the technical description necessary to procure an equipment item. In toto, the AR 310-25 definition states:

> "Technical Data Package. A technical description of an item or a service adequate for use in procurement. The description is sufficiently complete to control the configuration to the required degree of design disclosure and the item quality to the required level and will consist of all applicable technical data such

> as plans, drawings, specifications, purchase description, standards, models, performance requirements, quality assurance provisions, and packaging data."

DARCOM Supplement 1 to AR 37-100-XX, on the other hand, describes TDP in a much broader sense, stating:

> "Depending on the particular life cycle phase in which an item of equipment is presently located, the cost of gathering source data, developing, producing, publishing, or processing maintenance support materiel, equipment and technical publications, and other documentation considered to be part of the technical data package (TDP) which is needed to support an item of equipment throughout its life cycle, and will be financed as described below..."

Clearly, the latter description is of much greater scope than that found in AR 310-25; the responsibility for TDP established by the DARCOM supplement includes technical manuals, maintenance and overhaul manuals, lubrication charts, etc., as well as the technical data elements of the AR 310-25 definition. The differences could be explained as resulting from a DARCOM expansion of the AR definition, but the DARCOM LOIs to the MDCs and MRCs talk about TDPs and publications separately. The clear implication to the LOI reader is that TDPs do not include manuals and other publications necessary to operate and maintain a fielded system. Within the MDCs visited, personnel working with budget matters tend to use the broad interpretation of TDP, while personnel who neither have access to nor use the DARCOM supplement use the narrow definition of the term. Consequently, when the term TDP is used, its intended meaning can be misunderstood.

5.7 During the study, some discrepancies were noticed between material in AR 37-55 and that in AR 37-100-80. AR 37-55, Uniform Depot Maintenance Cost Accounting and Production Reporting System (June 1972) (Appendix H) contains definitions of cost codes under examination in this study, and when compared to definitions of the same cost codes in AR 37-100-80, several inconcistencies are exposed. Since the cost codes defined in AR 37-100-XX can, and do, change as the AR is republished each year, such inconsistencies are to be expected. One solution to this problem might be to delete cost code definitions from AR 37-55 when it is next revised and to insert in AR 37-55 a cross-reference to AR 37-100-XX.

5.8 In order to reach an understanding regarding funds usage policies that would serve as a basis for the analysis of development command practices, the study team interpretation of the above information is summarized briefly below.

5.8.1 Congressional intent is that all costs associated with research and development are to be borne by the RDTE appropriation. Tasks designed to product improve or increase producibility, reliability, maintainability and availability of weapons and equipment, regardless of life cycle phase, are a normal function of the R&D community.

5.8.2 The DOD official position is in agreement with Congressional intent except that product improvement to correct faults due to poor material introduced during production or due to incorrect manufacturing or imperfect maintenance procedures should be PA or OMA funded. (Introduction of improved materials or technological advances, subsequent to fielding, would also fall into this category.)

5.8.3 DOD budget guidance is that all RDTE-related effort including grey areas should be funded by RDTE appropriation. Product improvements should be RDTE funded unless a) the item is in or through production and b) the performance envelope is not being increased. When both conditions are met, funding is with PA if production is ongoing; otherwise, OMA funds are appropriate.

5.8.4 Army guidance appears generally to agree with higher level guidance. The definitions of OMA budget cost codes 738017.000Q1 and Q3 appear to conform with guidance through the restriction of their use to fielded equipment. Only the definition of cost code 738017.000P3 appears to violate policy guidance by sanctioning the use of OMA funds during the conceptual phase of the life cycle.

5.8.5 DARCOM supplementary guidance is generally in consonance with higher levels. It does distinguish some type tasks that should be OMA rather than PA funded during production but does not violate the higher guidance regarding RDTE fund usage versus other appropriations.

5.8.6 The basic guidelines and constraints are thus seen to be:

5.8.6.1 All effort on items under development is to be RDTE funded.

5.8.6.2 Effort on items in production or past production will be RDTE funded if the effort expands the performance envelope; otherwise, they will be PA funded if the item is in production and OMA funded if the item is no longer in production.

5.8.6.3 Army budget code 738017.000Q1 and Q3 funds are for use only on fielded equipment.

5.8.6.4 The definition of Army budget code 738017.000P3 appears to provide a basis for OMA expenditure on items under development; this may be contrary to Congressional intent and to DOD policy.

5.8.6.5 Budgeting for programmed requirements should be the responsibility of the command exercising managerial control over an equipment system rather than of the command performing any given function on that system.

6. Visits to the Materiel Development Commands. As a result of the Army Materiel Acquisition Review Committee (AMARC) report, DARCOMs commodity commands were organized into development commands and readiness commands. Three development commands were visited during the course of this study. At each of the DARCOM MDCs two documents have a primary impact on the

study. These are the Organization, Mission, and Functions (OM&F) Manual which is based on and patterned after the DARCOM-R 10-82 and the support agreements which each MDC has negotiated with its counterpart readiness command. These two documents were reviewed at each command visited during the study. The major effort at each command was devoted to a study of the functions performed by the P7M directly-funded personnel.

6.1 Visit to MIRADCOM.

6.1.1 MIRADCOM was visited during the period 16-19 July 1979. Meetings were held with the Director and budget personnel from the Resource Management Directorate, and with personnel from the Engineering Laboratory, the Technology Laboratory and the Product Assurance Directorate. Additionally, meetings were held with representatives of the General Support Rocket System (GSRS), Roland, and Pershing Project Management Offices.

6.1.2 MIRADCOMs OM&F Manual (MICOM-R 10-2, Volume 2, 1 July 1979) charges the Technology Laboratory with improving the reliability of missile systems. The Engineering Laboratory is the element responsible for a comprehensive and integrated test program for MIRADCOM and MIRCOM, and it is also the element responsible for staff management and execution of configuration management, system engineering, TDP management, value engineering, production engineering, and product improvement programs (PIPs). The Product Assurance Directorate (PAD) is tasked to conduct quality assurance programs for any program assigned

to MIRADCOM. Pertinent extracts of MICOM-R 10-2, Volume 2, are at Annex 8, Appendix B.

6.1.3 MIRADCOM had a "Working Relationship Agreement" with MIRCOM, which was signed by the two commanders involved. In it, MIRADCOM agrees to furnish the following support to MIRCOM.

6.1.3.1 "Scientific and engineering in-house laboratory capability."

6.1.3.2 "...Failure Rate and Failure Experience Data Banks..., Components Storage Reliability Data, Reliability Analysis Center (RAC) Data, and other required reliability data research services..."

6.1.3.3 Initial and follow-on update to documentation on which MIRADCOM expects repository service from MIRCOM. (More complete extracts are provided in Annex 9 to Appendix B.)

6.1.4 Supplement number F2 to the MIRCOM/MIRADCOM Working Relationship Agreement deals with Programming, Budgeting and Funding. It states flatly that Budget Program 730000 is the sole responsibility of MIRCOM and that all 730000 funds will be received and issued by MIRCOM.

6.1.5 Shortly prior to the visit, MIRADCOM and MIRCOM had been merged and redesignated MICOM; however, the two elements were just starting the process of physically recombining and relocating directorates. The data collected concerning employment of directly funded P7M spaces (cost codes 738017.000P3/Q1/Q3) was valid as of 30 June 1979. (Data collected at the other development commands used the same base date.)

Despite the statement made in Supplement F2 of the Working Relationship Agreement, within MIRADCOM there are a total of 67 P7M (cost code 738017.000P3/Q1/Q3) slots authorized. These are located as indicated in Table 2.

TABLE 2

MIRADCOM P7M FUNDED PERSONNEL
AS OF 30 JUN 79
AMS CODES 738017.000P3/Q1/Q3 ONLY

KEY: AUTHORIZED/ASSIGNED

| MIRADCOM Element | | Number of Spaces P3 | Q1 | Q3 | Totals |
|---|---|---|---|---|---|
| Engineering Laboratory | | | 43/40 | | 43/40 |
| Technology Laboratory | | | 4/4 | | 4/4 |
| Product Assurance Directorate | | | 1/1 | 3/2 | 4/3 |
| Project Managers | Stinger | 4/5 | | | 4/5 |
| | GLD | 2/2 | | | 2/2 |
| | Pershing | | 4/4 | 4/3 | 8/7 |
| | 2.75" Rocket | | 2/2 | | 2/2 |
| TOTALS | | 6/7 | 54/51 | 7/5 | 67/63 |

6.1.5.1 The majority (43 out of 67) of the P7M spaces are found in the Engineering Laboratory. When MICOM was split into MIRCOM and MIRADCOM, the Engineering Laboratory became a part of MIRADCOM.

Rather than duplicate the laboratory facilities in MIRCOM to handle the engineering requirements generated by fielded systems, an agreement was negotiated whereby MIRADCOMs Engineering Laboratory would perform any such necessary engineering services. The laboratory support includes failure analyses, performance testing, and product improvements. An example of the latter is the introduction of an interrupter switch into the Shillelagh system to cause an abort in the event of a guidance malfunction. All Engineering Laboratory P7M slots are allocated to cost code 738017.000Q1. The P7M funds to cover the salaries of these personnel are alloted to and paid by MIRADCOM; any other costs for services requested by MIRCOM (i.e., materials, travel, etc.) are reimbursed from OMA funds by the readiness command. The number of P7M personnel slots within the laboratory varies from year to year as materiel systems enter or are removed from the active inventory. The current number (43) of authorized P7M slots within the laboratory is down from a one time high of 65. The number will continue at 43 in FY 80 based on the estimates of effort developed by the Resources Management Directorate.

6.1.5.2 Within the Technology Laboratory, four P7M slots (cost code 738017.000Q1) are authorized for the Software Section in support of the TSQ-73 which was fielded this year. (As with the Engineering Laboratory, in order to avoid duplication of costly facilities, the Technology Laboratory supports both MIRADCOM and MIRCOM.) Approximately 25 man-years of contract effort will be expended in support of TSQ-73

software programs in FY 80. The four P7M-designated slots within the laboratory are to handle small jobs and maintain an overview of the effort that is placed on contract.

6.1.5.3 The four P7M slots authorized in the Product Assurance Directorate (PAD) support the Pershing missile system. The Pershing PMO, which was under the control of MIRADCOM as of 30 June 1979, supports the currently fielded Pershing I missile system to include an ongoing procurement effort as well as the research and development of the improved Pershing II system. The PAD effort includes review of Depot Maintenance Work Requirements (DMWRs) and implementation of necessary reforms, review of failure data/test reports, and evaluation of engineering changes, deviations, and waivers pertaining to the fielded system.

6.1.5.4 Sixteen (16) P7M slots were identified within four MIRADCOM PMOs. Two projects (Stinger and the Ground Laser Designator (GLD)) had entered initial procurement and were spending cost code 738017.000P3 funds (Pre-Issue Organic Maintenance Engineering Services) in preparation for the fielding of the system. The other two systems (Pershing and the 2.75 Rocket) had been fielded and were spending 738017.000Q1 and Q3 monies.

6.1.5.5 In the main, MIRADCOM usage of P7M-funded personnel appears to be in compliance with policy and the AMS definitions of AR 37-100-80, even though contrary to the "Working Relationship Agreement." All Q1/Q3 effort is in support of fielded systems. The only question regarding these codes is whether any of the "product

improvement" effort in the Engineering Laboratory expands the performance envelope; if so, RDTE funds would be appropriate. The use of P3 funded spaces in the Stinger and GLD PMOs appears to be questionable. Although the AR 37-100-80 definition states that P3 monies can be spent during the conceptual and acquisition phases of the life cycle, the general definition in the AR (cost code PØ) limits the use of 738017.000PX funds to centrally managed maintenance programming and planning support. DARCOM Supplement 1 to AR 37-100-80 discusses the use of "PX" monies in the paragraph addressing TDP, and there states that when costs are incurred in developing general maintenance concepts which are not oriented toward a specific item of hardware, these funds will be used. However, the MIRADCOM PMOs use of P3 monies is, in each case, to support transition of an individual materiel system.

6.2 Visit to AVRADCOM.

6.2.1 AVRADCOM was visited during the period 30 July through 3 August 1979. Interviews were held with the Comptroller; the Chief of the Program Budget Division; Chief of the Force Development and Management Office; Chief of the Quality Requirements Division of the Product Assurance Directorate; Chief of the Technical Programs Division of the Systems Engineering Directorate; Chief of the Configuration Management Branch, Engineering Data Management Division of the Systems Engineering Directorate; the Director of Plans and Analysis; and personnel from the Integrated Logistics Support Office (ILSO), the Procurement and Production Directorate, and the Development and Qualification Directorate.

6.2.2 The OM&F Manual (AVRADCOM-R 10-1, 1 July 1977) tasks the Product Assurance Directorate (PAD) with quality assurance support of AVRADCOM programs and with reliability, availability, maintainability (RAM) support to colocated PMs for all phases of the life cycle. The Development and Engineering Directorate (now split into two directorates) is responsible for the Army Air Worthiness/ Qualification Program and Aeronautical Design Standards Program; is charged to provide engineering support for major PIPs and/or engineering change proposals (ECPs) in support of fielded systems when so tasked by the readiness command; and is to manage aviation-related electronics systems throughout the life cycle of the aircraft system. The Plans and Analysis Directorate is charged with management of the command ORSA and Cost Analysis Programs. Force development programs are developed and managed by the Force Development and Management Office (FD&MO), and the Integrated Logistics Support Office (ILSO) handles integrated logistics support (ILS) for the command. The Avionics Research and Development Activity, located at Fort Monmouth, NJ, is responsible for that portion of the AVRADCOM mission pertaining to avionics. Finally, the US Army Plant Representative Offices (ARPROs) which are located with the Bell, Boeing, and Hughes plants are primarily charged with contract administration. Pertinent extracts of AVRADCOM-R 10-1, 1 July 1977, are at Annex 10, Appendix B.

6.2.3 The Intraservice Support Agreement between the US Army Troop Support and Aviation Materiel Readiness Command (TSARCOM) and AVRADCOM

primarily addresses installation and administrative type support. Only one category of support appeared to apply to this study; that is, technical data services. That section of the support agreement states:

> "Receiver (AVRADCOM) will provide approved Contract Data Requirements Lists and Spec-Trees (sic) for all Army aircraft procurement actions throughout the equipment life cycle." (Page 7 of 25 of the support agreement.)

6.2.4 The P7M spaces of interest authorized within AVRADCOM as of 30 June 1979 numbered 175. Of these, 131 were located within the St. Louis area, and 44 were assigned to remote locations. The distribution of the P7M slots by organizational element/location is indicated in Table 3.

6.2.4.1 The Systems Engineering Directorate has 96 authorized P7M spaces. Most of these are engineer slots assigned to the Operational Systems Division (cost code 738017.000Q3); primarily, they are responsible for keeping the Technical Data Packages (TDPs) current and accurate throughout the life cycle of all aircraft systems. The fielded systems now being supported are: UH-1, AH-1, UH-60, LOH, CH-47, CH-57, OV-1, and various fixed-wing aircraft systems. Within the Data Management Division, the Configuration Management Branch has eight configuration specialists (cost code 738017.000Q3) whose function is to provide interface with the engineers maintaining the TDP on fielded systems. Finally, the Technical Program Division has the eight P7M spaces in cost code 738017.000P3. These personnel perform program and budget functions

TABLE 3

AVRADCOM P7M-FUNDED PERSONNEL SPACES
AS OF 30 JUN 79
AMS CODES 738017.000P3/Q3 ONLY

KEY: AUTHORIZED/ASSIGNED

| AVRADCOM Element | | No of Spaces | | Totals |
|---|---|---|---|---|
| | | P3 | Q3 | |
| St. Louis | Systems Eng Directorate | 8/8 | 88/88 | 96/96 |
| | Devel & Qual Directorate | | 18/18 | 18/18 |
| | Product Assurance Directorate | | 11/15 | 11/15 |
| | Int Log Spt Office | 4/4 | | 4/4 |
| | Plans & Analysis Directorate | 2/1 | | 2/1 |
| | Force Devel & Mgt Office | | 0/5 | 0/5 |
| Other Locations | Avionics R&D Activity | 3/2 | 7/6 | 10/8 |
| | Bell ARPRO | | 15/17 | 15/17 |
| | Hughes ARPRO | | 13/16 | 13/16 |
| | Boeing ARPRO | | 6/7 | 6/7 |
| TOTALS | | 17/15 | 158/172 | 175/187 |

(i.e., administrative support) for the directorate. The individual interviewed commented that these spaces were OMA-funded because AVRADCOM was restricted in the number of slots which could be made available from the management account of the RDTE appropriation.

6.2.4.2 The eighteen (18) P7M spaces (cost code 738017.000Q3) in the Development and Qualification Directorate are filled by engineers who work on the requalification of fielded aircraft systems following the implementation of a PIP or modernization program. Based on the estimated man-years to support the fielded systems, the director determines the number of P7M slots needed.

6.2.4.3 The Product Assurance Directorate is authorized 11 P7M spaces (cost code 738017.000Q3) and has 15 personnel actually assigned. All are with the Quality Requirements Division. The division is authorized a total strength of 32; of these, only 6 are RDTE funded, 15 are P7S funded and the remaining 11 are P7M funded. The P7M and P7S slots were transferred into the directorate after AMARC and have been retained. The division furnishes some quality assurance work in support of TSARCOM-managed aircraft systems in the field, but its primary job is to furnish quality assurance support to AVRADCOM-managed systems before fielding. A recent survey indicated that only about two man-years of effort are expended in support of fielded systems in the course of a year.

6.2.4.4 The ILSO has four P7M slots (cost code 738017.000P3) authorized and four persons assigned. The ILSO performs various

logistical functions on and for the developing systems. The office does not work on or with fielded systems. The individual interviewed stated that since logistical activities are normally funded with OMA funds, the ILSO used the OMA account.

6.2.4.5 The Plans and Analysis Directorate manages and conducts AVRADCOMs ORSA and Cost Analysis Programs. Although the directorate is authorized two P7M spaces (738017.000P3), only one is filled. This is based on the director's estimate that one man-year of effort is currently expended annually in support of reconfiguration programs for fielded aircraft systems.

6.2.4.6 The Force Development and Management Office (FD&MO) maintains a standby typing pool; these typists are to temporarily replace permanently assigned typists anywhere within HQ AVRADCOM who are absent because of illness or ordinary leave. When job vacancies occur, replacements are drawn from the typing pool. Funds to pay the typists in the pool are divided between the RDTEA, OMA, and PAA appropriations on a pro-rata basis. Five of the typists are paid with P7M (cost code 738017.000Q3) funds.

6.2.4.7 The Avionics Research and Development Activity (AVRADA), located at Fort Monmouth, NJ, was transferred from the US Army Electronics Command (ECOM) to AVRADCOM as a result of the AMARC study. The organization has 10 authorized P7M slots (cost code 738017.000P3, three and cost code 738017.000Q3, seven). The Chief of the FD&MO stated that AVRADA supports fielded systems, but he was unable to say whether

the scope of effort justified the 10 slots authorized.

6.2.4.8 The Industrial Management and Production Division of the Procurement and Production Directorate manages the three Army Plant Representative Offices (ARPROs). These are located with Bell Helicopter Textron in Fort Worth, with the Hughes Helicopters-Summa in Culver City, California, and with the Boeing-Vertol Company in Philadelphia. The ARPROs represent all DOD interests at their respective plants, not just Army interests. (The Navy and Air Force have plant representative offices at other contractor plants.) The 34 P7M authorized personnel (cost code 738017.000Q3) are primarily engineers; there are also 217 P7S spaces authorized. The ARPRO performs field services on Army, other US government and foreign contracts; the services include field contract administration, engineering, property administration; flight acceptance and movement of materiel to consignee agencies; industrial mobilization and production planning; expediting, shipping, inspection and acceptance; contract termination, overhead analysis, and quality assurance. They administer four types of contracts: initial production, follow-on buys, modernization programs, and R&D programs. The use of O&M P7M funds by the ARPROs is of at least 15 years standing. The ARPROs provide some support to fielded systems which undergo modernization programs (e.g., the CH-47A, CH-47B, and CH-47C fleet in the field will shortly be undergoing a program to upgrade and bring the aircraft back to a "like new" condition); however, it is not known what proportion of the total ARPRO effort is expended on fielded systems.

6.3. Visit to TARADCOM.

6.3.1 TARADCOM was visited during the period 13-16 August 1979. The Acting Comptroller and his deputy were interviewed as well as personnel from the Budget Division and representatives of the ILSO, the Product Assurance Directorate (PAD), the Tank-Automotive Systems Laboratory, and the Engineering Support Laboratory.

6.3.2 The TARADCOM OM&F Manual (TARADCOM-R 10-3, 10 May 1978) tasks the ILS office with the management of ILS actions throughout the command and with interface actions with the US Tank-Automotive Materiel Readiness Command (TARCOM) for assigned systems. The Tank-Automotive Systems Laboratory is charged to support PIPs and value engineering programs. The PAD is responsible for product assurance programs to include quality engineering services and technical data for fielded systems undergoing modification, rebuild, and overhaul. Pertinent extracts of TARADCOM-R 10-3, 10 May 1978, are at Annex 11, Appendix B.

6.3.3 The Intraservice Support Agreement between TARADCOM and TARCOM addresses mission support services which the respective commands will provide one another. In it, TARADCOM agrees to furnish the following post-transition support to the readiness command (more complete extracts are at Annex 12, Appendix B.)

6.3.3.1 In the area of production engineering, include TARCOM requirements in PIP and RDTE programs and budget, and provide engineering technical support as required.

6.3.3.2 Prepare and coordinate technical documentation and provide TDP control for TARCOM.

6.3.3.3 Serve as the functional office for the Configuration Management Program.

6.3.3.4 Provide continuing product assurance and quality engineering support in areas of expertise exclusive to TARADCOM.

6.3.3.5 PIPs which will improve the performance envelope of a vehicle are the management responsibility of TARADCOM. Normally, in the modification of fielded vehicles, TARADCOM is responsible for design testing, ILS planning, product assurance, and assuring that the modification will work.

6.3.4 TARADCOM had 30 directly-funded P7M slots as of 30 June 1979.

6.3.4.1 Twenty-two (22) of these were P3 slots and were in the ILSO. Among the pre-transition responsibilities of the ILSO are the Logistic Support Analysis Records, analysis of test data, and that portion of the Acquisition Plan dealing with logistic support. Post-transition ILSO responsibilities include responsibility for engineering design integrity and review of PIPs. It was stated that RDTE funds had been requested for the ILSO, but the request had been refused by the command comptroller (since departed). The ILSO is staffed with four supervisors, four clerk-typists, one program analyst, three engineers, two equipment specialists, and eight logistics management specialists from cost code 738017.000P3.

6.3.4.2 The remaining eight directly-funded P7M slots (738017.000Q3) were in the Product Assurance Directorate to support PIPs on fielded systems as part of the TARADCOM responsibility to review and revise TDPs.

6.3.5 In addition to the directly-funded P7M slots discussed above, TARADCOM has a number of reimbursable P7M slots.

6.3.5.1 The Engineering Support Laboratory has 25 P7M 738017 slots, all of which are paid for on a reimbursable basis. The Laboratory performs Technical Data Package revisions/updates for fielded systems. TARCOM is the physical repository for TDPs on fielded systems while TARADCOM retains technical review responsibility. The laboratory also performs analysis on engineering change proposals and engineering improvement reports. Reimbursable funds received by the Engineering Support Laboratory are paid by the contracting activity, using the financial account it deems appropriate subject to the guidance in DARCOM Supplement 1 to AR 37-100-XX.

6.3.5.2 The Tank-Automotive Systems Laboratory of TARADCOM was funded with 1.4 man-years of work through 30 June 1979 reimbursed from 738017.000Q1 or Q3 as determined by the tasking activity to be proper for the work performed.

7. Analysis and Discussion of Directly-Funded P7M Spaces at the Development Commands.

7.1 Spaces Funded by Cost Code 738017.000P3.

7.1.1 This cost code is titled "Organic Maintenance Engineering Services (Pre-Issue)" and its definition in AR 37-100-80 appears to authorize P3 fund use during the conceptual and aquisition phases of the life cycle. As discussed above, this may be contrary to higher level policy.

7.1.2 Actual functions performed by personnel in the directly-funded P3 positions are summarized in Table 4 below:

TABLE 4

SUMMARY OF P7M 738017.000P3
DIRECTLY-FUNDED SPACES

| Command | Element | Auth/Act | Functions Performed |
|---|---|---|---|
| MIRADCOM | Stinger PM | 4/5 | During initial procurement, prepare system for fielding. |
| | GLD PM | 2/2 | During initial procurement, prepare system for fielding. |
| AVRADCOM | Sys. Eng. Dir. | 8/8 | Program, budget, admin. spt. |
| | ILSO | 4/4 | Logistics on developing systems. |
| | Plans & Analysis Dir. | 2/1 | ORSA & cost analysis on fielded systems. |
| | Avionics R&D Act. | 3/2 | Spt. of fielded systems. |
| TARADCOM | ILSO | 22/22 | Pretransition-LSAR, test data acquisition plan. Post-transition-PIPs, Eng. design integrity. |
| TOTALS | | 45/44 | |

7.1.3 Because of the possible confusion surrounding this cost code and its intent, it is difficult to render a firm opinion regarding the use of P3 funds in the development commands. Two comments only are offered. First, the functions performed in AVRADCOMs Systems Engineering Directorate appear improperly funded; and second, many of the functions listed for fielded systems might be more properly funded from cost code 738017.000Q1 or Q3.

7.2 Spaces Funded by Cost Code 738017.000Q1.

7.2.1 This cost code is titled "Organic Field Support Maintenance Engineering Services" and by definition is confined to specific types of effort on fielded systems. These types include analysis of proposed design and engineering changes; analysis of field reports; and engineering to correct faults discovered subsequent to production. The support provided to fielded systems by the development command results, primarily, from the support agreements drawn up between the colocated readiness and development commands.

7.2.2 Only one development command, MIRADCOM, has directly-funded spaces under this cost code. The functions performed by these MIRADCOM personnel are shown in Table 5.

TABLE 5

SUMMARY OF P7M 738017.000Q1
DIRECTLY-FUNDED SPACES

| Command | Element | Auth/Act | Functions Performed |
|---|---|---|---|
| MIRADCOM | Eng. Lab. | 43/40 | Failure analysis. performance tests, product improvement on fielded systems. |
| | Tech. Lab. | 4/4 | Software support of fielded TSQ-73. |
| | Prod. Assur. Dir. | 1/1 | QA support of fielded Pershing I. |
| | Pershing PM | 4/4 | Support of fielded Pershing I. |
| | 2.75" Rocket | 2/2 | Support of fielded system. |
| TOTALS | | 54/51 | |

7.2.3.1 Use of directly-funded Q1 spaces by MIRADCOM appears proper at least from the viewpoint that the functions performed are in every case in support of fielded systems. Whether it is proper from the other viewpoints is difficult to determine. The majority of the effort, especially in the laboratories, is in support of reconfiguration actions and the consequent TDP changes/revisions. The policy regarding funding of fielded system reconfiguration actions and associated documentation changes is somewhat complicated. If the performance envelope is increased, funding should be RDTE; if not, funding may be from one of the 738017.000QX accounts. If the reconfiguration is as a result of deficiencies or malfunctions occurring after production, Q1 funding is appropriate; if the reconfiguration is to reduce materiel, production and/or maintenance costs, Q3 funding is authorized.

7.3 Spaces Funded by Cost Code 738017.000Q3.

7.3.1 This cost code is titled "Organic Other Engineering and Analysis Services" and by definition is confined to effort expended on fielded systems. The types of effort are those not covered by the Q1 cost code.

7.3.2 All three development commands visited have directly-funded Q3 spaces. Functions performed are summarized in Table 6.

7.3.3 Funding of certain of the AVRADCOM spaces shown in Table 6 appears inappropriate.

7.3.3.1 Effort expended by the directly-funded personnel in the Product Assurance Directorate of AVRADCOM is more in support of systems

TABLE 6

SUMMARY OF P7M 738017.000Q3
DIRECTLY-FUNDED SPACES

| Command | Element | Auth/Act | Functions Performed |
|---|---|---|---|
| MIRADCOM | Prod Assur Dir | 3/2 | Spt of fielded Pershing I (DMWR, failure data, eng dwg) |
| | Pershing PM | 4/3 | Support of fielded Pershing I |
| AVRADCOM | Sys Eng Dir | 88/88 | TDPs, config ctl of fielded systems. |
| | Devel & Qual Dir | 18/18 | Requalif. of fielded aircraft. |
| | Prod Assur Dir | 11/15 | QA spt on developing & on fielded systems. |
| | Force Dev & Mgt Ofc | 0/5 | Typing pool. |
| | Avionics R&D Act | 7/6 | Spt of fielded systems. |
| | Bell ARPRO | 15/17 | Contract admin, eng, QA, etc. on developing and fielded systems. |
| | Hughes ARPRO | 13/16 | Contract admin, eng, QA, etc. on developing and fielded systems. |
| | Boeing ARPRO | 6/7 | Contract admin, eng, QA, etc. on developing and fielded systems. |
| TARADCOM | Produc Assur Div | 8/8 | QA, PIPs and TDP changes on fielded systems. |
| TOTALS | | 173/185 | |

under development than of fielded systems. RDTE funds are indicated for such effort.

7.3.3.2 The temporary typing pool in the Force Development and Management Office of AVRADCOM is funded using monies from the OMA (P7M - cost code 738017.000Q3), PAA, and RDTE appropriation. Five clerk-typists are paid using P7M funds; this number is based on the proportion of the headquarters funded with P7M monies. No regulatory justification for this action was found, and it runs counter to the guidance in the DOD Budget Guidance Manual and AR 37-100-XX which states that all RDTE related effort should be funded in the RDTE appropriation (DOD 7110-1-M, paragraph 251.4).

7.3.3 AVRADCOMs Army Plant Representative Offices (ARPROs) have traditionally used OMA P7M monies in funding their operations. Primarily, the ARPRO administers contracts. At times, the ARPRO will work with contracts which are let to modify or modernize fielded aircraft systems, but this would seem to be a relatively minor part of the job. The OMA P7M funds represent about 15 percent of the ARPROs personnel costs; the remainder is paid with P7S monies. The ARPROs were not visited; therefore, it is not known if the P7M expenditure in funds matches the man-years of effort expended on fielded systems. Since a cost code exists to cover contract administration (721113.2), its use would seem more appropriate than use of 738017.

7.3.4 The propriety of the funding of the remaining spaces shown in Table 6 is subject to the same comments as were made above regarding

Q1 spaces. The majority of effort is directed to fielded system reconfiguration actions and their associated documentation change requirements. Whereas MIRADCOM uses Q1 spaces for such effort, AVRADCOM uses Q3 and TARADCOM uses reimbursable, not directly-funded spaces.

8. Findings.

8.1 The intent of Congress and of DOD policy is that all research and development activity be funded by RDTE appropriations. A system is considered to be under development until it reaches the point where it has been type classified, has a complete technical data package (TDP), and is ready to be produced. Additionally, DOD/DA guidance is that any improvement which increases the performance envelope of a system, regardless of the life cycle of the system, will be RDTE funded. Any other effort expended on a system after development is complete will not be RDTE funded.

8.2 Higher level guidance (DOD and above) speaks directly to the types of functions to be funded by each appropriation and not directly to the type of organization (MDC versus MRC) which performs the functions.

8.3 DARCOM guidance and intraservice support agreements between an MDC and its related MRC define the types of functions to be performed by the MDC and MRC. Some functions currently performed by MDC elements as a result of the DARCOM guidance are of the types that are to be OMA or PA, rather than RDTE, funded.

8.4 DARCOM guidance stresses that no matter who performs a function, the command having management control over a system shall budget all programmed requirements.

8.5 A divergence exists between the MDCs in procedures for budgeting of personnel resources for OMA-funded functions. In all cases, spaces are identified on the MDC TDAs; however, in some cases, the spaces are directly-funded by the MDC; in other cases, the spaces are reimbursable from the MRC to the MDC.

8.6 AR 37-100-XX and DARCOM Supplement 1 thereto, the primary source documents for use by the DARCOM major subcommands in determining fund propriety, are subject to differing interpretations by the subcommands.

8.7 The definition of cost code 738017.000P3 in AR 37-100-80 is interpreted by some MDCs as authorizing the expenditure of OMA funds during system development.

8.8 Similar engineering/laboratory functions performed by the MDCs in support of fielded systems are funded under different P7M cost codes. For such functions, MIRADCOM uses cost code 738017.000Q1 whereas AVRADCOM uses mainly 738017.000Q3.

8.9 The three Army Plant Representative Offices (ARPROs) whose primary function is contract administration are staffed in part with personnel spaces funded from cost code 738017.000Q3.

8.10 Two interpretations of the term "Technical Data Package (TDP)" are used within DARCOM. The AR 310-25 definition confines the TDP to the documentation for use in procurement whereas the DARCOM Supplement 1 to AR 37-100-XX describes TDP as including all documentation needed to support an item throughout the life cycle.

9. Conclusions.

9.1 Per higher level guidance, certain functions performed by the MDCs in support of fielded systems are properly funded by P7M. However, there should be consistency between MDCs as to whether these functions are directly funded or reimbursable. Since such effort concerns fielded systems only, and in consonance with the DARCOM guidance, reimbursement rather than direct funding seems appropriate and would help insure no expenditure of P7M funds during the system development cycle.

9.2 The definition of cost code 738017.000P3 in AR 37-100-80 can be interpreted to authorize the expenditure of OMA funds by the MDC during the conceptual (i.e., development) and acquisition phases of the life cycle for specific systems; these funds, however, should be spent by the MDC only in support of general maintenance concepts not related to a specific item of equipment as specified in summary code 738017.000PO.

9.3 Two steps would serve to reduce divergent interpretations of regulatory guidance within the DARCOM. These are:

9.3.1 Consult with representatives of the materiel development commands, determine whether the divergency of regulatory interpretations is due to misinterpretation or organizational requirements, and, insofar as feasible and desirable, standardize the interpretation of P7M budget guidance.

9.3.2 Develop specific guidance focused on maintenance support activities in relation to fielded quipment performed by the MDCs and publish it in the DARCOM Supplement to AR 37-100-XX.

9.4 Personnel spaces in the Army Plant Representative Offices (ARPROs) might be more appropriately funded by cost code 721113.20000 (Contract Administration Operations) than by cost code 738017.000Q3.

10. Recommendations. It is recommended that:

10.1 The definition of cost code 738017.000P3 in AR 37-100-80 be examined for conformance with higher level guidance and clarified so as to avoid differing interpretations.

10.2 Consideration be given to the feasibility of funding the OMA-type functions performed by the DARCOM MDC in support of fielded systems on a reimbursable basis from the MRC, rather than direct funding by the MDC.

10.3 Develop and publish in the DARCOM Supplement 1 to AR 37-100-XX specific guidance focused on the use of OMA P7M monies within the MDCs.

10.4 Consistency be achieved between the MDCs in the use of cost codes 738017.000Q1 and 738017.000Q3.

10.5 Certain personnel spaces in the Army Plant Representative Offices be funded from cost code 721113.2 rather than from cost code 738017.000Q3.

10.6 A single definition of "Technical Data Package" be utilized throughout DARCOM.

APPENDIX A, ANNEX 1

EXTRACTS FROM AR 37-100-80
CHAPTER 5, SECTION VIII

ACTIVITY AND PERFORMANCE FACTOR DEFINITIONS

Code 738017.000P3 - Organic Maintenance Engineering Services (Pre-Issue). Provides for maintenance engineering performed by Department of the Army military or civilian personnel during conceptual and acquisition phases to assure maintenance readiness of equipment and beginning with proposed qualitative materiel requirements (QMR) and extending through first delivery of standard production items; and all maintenance engineering on limited production items until type classified as applied to each of the following categories or equipment. Includes, but is not limited to, maintenance engineering relative to reliability and maintainability criteria and specifications requirements, development of maintenance concepts, and maintainability objective recommendations for input to QMR's; maintenance and design input through active participation during research, development, testing procurement, and production cycle, including attendance at the inprocess review and revision of maintenance support plan as required; maintenance support planning (AR 750-1): maintenance input to procurement packages and/or end item procurement contract; maintenance value and human engineering analysis of materiel and review of engineering changes during production, and modification, after production but prior to issue to user. All resources will be identified to the appropriate category of equipment.

APPENDIX A, ANNEX 2

EXTRACTS FROM AR 37-100-80
CHAPTER 5, SECTION VIII

ACTIVITY AND PERFORMANCE FACTOR DEFINITIONS

Code 738017.000Q1 - Organic Field Support Maintenance Engineering Services. Provides for maintenance engineering, and engineering after completion of production, as performed by Department of Army military or civilian personnel relative to fielded equipment (i.e., equipment which has entered the Army's supply system), (completion of production occurs when the final delivery of an item under existing contracts has been made). Includes analysis of proposed design and engineering changes related to safety and maintenance of equipment; engineering and technical analysis of field reports pertaining to materiel subsequent to initial review and determination by maintenance personnel of production deficiencies; engineering performed to correct deficiencies or malfunctions occurring after completion of Weapon/Support Systems Production; engineering required to technically update commercial-type items which are type classified but not currently in production; and other maintenance engineering support as may be required. All resources will be identified to the appropriate following categories of equipment. Exclude the following: Production engineering, performed during or prior to production of items, provided for under the procurement appropriations and engineering effort which is properly the responsibility of RDTE.

APPENDIX A, ANNEX 3

EXTRACTS FROM AR 37-100-80
CHAPTER 5, SECTION VIII

ACTIVITY AND PERFORMANCE FACTOR DEFINITIONS

Code 738017.000Q3 - Organic Other Engineering and Analysis Services. Provides other maintenance engineering and analysis performed by Department of the Army military and civilian employees, not covered under engineering activities above, as applied to each of the following categories of equipment. Includes maintenance engineering relative to economical repair limits; quality assurance and procedures; engineering of items and components to reduce materiel, production, and maintenance costs; reclamation and fabrication procedures and techniques; depot maintenance production time procedures; test programs and adapters for use with Depot Installed Maintenance Automatic Test Equipment (DIMATE); DOD standardization actions; parts reduction, parts interchangeability and substitution analyses; parts and materiel identification; processing, recordkeeping, data collection, and analyses of data from The Army Maintenance Management System (TAMMS) when performed by National Maintenance Points; also includes cost of operating the US Army Metrology and Calibration Center and the Maintenance Management Center (MMC) as related to maintenance functions; and research and development of maintenance policies; procedures, and regulations. All resources will be identified to the appropriate category of the following equipment.

95TH CONGRESS } HOUSE OF REPRESENTATIVES { REPORT
1st Session } { No. 95-451

# DEPARTMENT OF DEFENSE APPROPRIATION BILL, 1978

JUNE 21, 1977.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

*Mr. MAHON, from the Committee on Appropriations, submitted the following*

## REPORT

together with

## SEPARATE AND ADDITIONAL VIEWS.

(To accompany H.R. 7933)

The Committee on Appropriations submits the following report in explanation of the accompanying bill making appropriations for the Department of Defense, and for other purposes, for the fiscal year ending September 30, 1978.

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INAPPROPRIATE BUDGETING OF RESEARCH AND DEVELOPMENT EFFORT

The military departments continue to persist in their efforts to inappropriately budget funds for tasks and programs that are clearly research and development in nature. The Committee has addressed this problem in previous reports.

Testimony has disclosed that internal directives and instructions hold, in effect, that if a weapon system has entered production, any costs associated with improving the system are considered by the Department to be a proper charge to the procurement appropriations. In the Committee's view, this distinction is artificial and one that the Committee does not support.

Funds are appropriated to the Department of Defense under separate titles and to individual accounts within those titles for specific purposes. Briefly, military personnel appropriations are for the purpose of funding pay, allowances, permanent change of station, and other costs related to military personnel. The operation and maintenance appropriations support costs associated with civilian pay, the operation and maintenance of weapons and equipment, as well as small purchases. Procurement appropriations are made to fund major military hardware, such as aircraft, missiles, ships, tanks, vehicles, ammunition and other ordnance, communications and electronics, and other military equipment.

Title V of the bill appropriates the funds required to research, develop, test and evaluate weapons systems and other equipment required by our military forces. The primary purpose of appropriating new budget obligational authority and transfer authority under separate titles and to individual accounts is to permit Congress to maintain a certain degree of control over the various specific functions.

There has been a disturbing trend over the years to move more and more in the direction of procurement funding for certain work that should be more properly funded in the research and development or the operation and maintenance appropriations. A few short years ago, the Committee insisted that all installation costs of weapon system modification kits as well as ship and ordnance alterations be moved from the procurement to the operation and maintenance appropriation. Likewise, the Committee directed that efforts such as component improvement of engines, product improvement of weapons and other equipment be funded in the research and development budget. Nevertheless, the Committee has found this trend continues with research and development efforts budgeted in the procurement appropriations and sometimes in the operation and maintenance appropriations under the guise of such budget activity titles as "Component Improvement", "Manufacturing Technology", "Reliability and Maintainability Improvement Changes" for aircraft, "Aircraft Equipment Reliability

and Improvement Program", and "Producibility, Reliability, Availability, and Maintainability" (PRAM) program.

In August 1975, the Air Force established a PRAM Program Office with 10 personnel. During fiscal year 1977, the program was expanded to include product improvement activities in the missile systems area. The purpose of the PRAM program is to increase the producibility, reliability, availability, and maintainability of weapon systems and equipment. A total of $52,474,000 was budgeted by the Air Force for PRAM in fiscal year 1978. Of the total, $2,000,000 was included in the research and development budget and most of these funds apparently pay for the cost of personnel, their travel, and other costs related to the operation of the PRAM program office. The remaining $50,474,000 consists of $39,129,000 in the procurement budget, $10,702,000 in the operation and maintenance budget, and $643,000 in the military personnel budget.

In the considered view of the Committee, any tasks designed to product improve or to increase the producibility, reliability, maintainability and availability of weapons and equipment are a function of the research and development program. Such efforts encompass design and engineering as well as the testing of the weapons and equipment, or subsystems and components thereof, selected for improvement. The procurement budget was established primarily to fund the *procurement and production of weapons and other military equipment* which have successfully completed their development and test program, met military specifications, and are ready to be placed in the operational inventories of the military services. The procurement language in an appropriation bill permits the expenditure of funds for modification and modernization of military hardware. This is meant to imply that the procurement appropriations may be used to purchase kits to modify and modernize such hardware, after completion of their successful development, testing and evaluation utilizing research and development funds.

If subsequent to the deployment of weapons and other military equipment it is found that improvements are necessary, the design, development, engineering and testing of such improvements should be a normal function of the research and development community. Unfortunately, there has been too little attention given in the past by the research and development community to the areas of producibility, reliability, availability, and maintainability during the development cycle of weapons and military equipment. Such PRAM emphasis should and must be an integral part of any development program. If the research and development community is required to utilize a portion of its budget to institute these PRAM efforts on equipment already in production, perhaps more attention will be given to including these requirements as an integral part of future development programs. Therefore, the PRAM Program Office should be directing its attention primarily to the research and development community instead of seeking ways of spending procurement and operation and maintenance appropriations to correct shortcomings of a poorly structured research and development program. It is far less costly to implement PRAM requirements during the development cycle than to institute those efforts subsequent to deployment of military hardware.

The military services continue to fund component improvement of engines in the procurement budget subsequent to their entering production. The Army budgeted $43,000,000 for the component improvement of the T700 engine used in the UH-60 Utility Tactical Transport Aircraft System (UTTAS), a helicopter which will replace the UH-1 helicopter. The purpose of the funding is to increase the operational reliability of the T700 engine from a mean time between failure of 1,272 hours to 1,500 hours.

The Navy's TF-30 engine used in the F-14 aircraft has been found to be deficient in a number of areas, and the Navy included $8,800,000 in component improvement funds in the procurement budget to correct deficiencies in the TF-30 engine. Similarly, the Air Force has experienced a number of problems with the F100 engine used in the F-15 and F-16 aircraft. Over 600 Air Force and contractor engineers have been assigned to identify the problems and develop corrections to those problems. A total of $37,000,000 in component improvement funds has been budgeted in the procurement account for those purposes. Component improvement of engines require thousands of man-hours and thousands of hours of high-speed computer time to design, engineer, and test needed improvements and corrections to those engines. Such work is clearly research and development in nature and an improper charge to the procurement budget.

For the foregoing reasons, the Committee has recommended that funding for PRAM, certain component improvement, and other reliability and maintainability efforts be deleted from the procurement and operation and maintenance budgets. In selected instances the funding has been transferred to the research and development appropriation. The Committee expects the Department of Defense, in structuring the fiscal year 1979 budget, to move all such effort to the research and development budgets.

The Committee has also been disturbed over the years about the inadequacy of our overall research and development program. There has been a tendency too often to curtail and shorten research and development effort when faced with a limitation of funding usually caused by program cost increases. The effect of such calculated decisions is inadequate and unrealistic testing, the introduction of deficient weapons and other equipment into our inventories, and the subsequent use of the procurement budget to correct the inadequacies of the development program. The correction of deficiencies thus requires funding of component improvements, product improvements, reliability improvements, maintainability improvements, and modification of such equipment in the procurement budget. Recent cases in point are the Army's Stinger missile and the Navy's Captor mine programs.

Because of program cost increases, the Army curtailed the Stinger missile development program. Fewer missiles were tested than originally programmed and many of the tests were unrealistic. For example, the Army subjected a quantity of Stinger missiles to certain environmental testing, thereafter inspected the missiles, repaired the damage caused by the environmental testing, and subsequently test fired them. The Army considered the favorable test flights as successes, even though the Stinger missile is designed to be a certified round

ready to fire after experiencing handling by troops and exposure to various environmental conditions. Military personnel responsible for firing Stinger are not trained to inspect and repair the Stinger in the field as was done during the Army's development test program.

The Navy likewise experienced cost increases early in the Captor mine development program. The Navy then curtailed the development effort by reducing engineering, software, testing, and the number of test units. Military components were substituted with commercial parts of lesser reliability. While very serious deficiencies and reliability problems were identified in development tests, the Navy prematurely entered production of Captor mines knowing the Captor was not operationally effective. A total of $181,000,000 in procurement funds will be required solely to increase the reliability of Captor during production. By comparison, the entire Captor research and development effort cost $100,000,000.

The Committee is seriously concerned with these and other instances involving all the military departments. Limited funding of research and development programs, curtailment of development effort, as well as an unrealistic and insufficient test program do not enhance deployment of operationally ready weapons and military equipment in a timely manner. It is penny wise and pound foolish to accelerate development efforts and prematurely produce deficient military hardware that in many instances do not readily improve our military capability when compared with the weapons and equipment they are designed to replace. In the final analysis, time is not saved because in most cases it takes several years of improvements and modifications to correct deficiencies caused by a poorly conducted development program. There are relatively very few programs that may deserve structuring on a "crash basis", the Trident and a few other strategic and national programs being notable exceptions. The Committee expects that the Department of Defense will give the foregoing matters serious and high priority attention when formulating the fiscal year 1979 budget.

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## APPENDIX B, ANNEX 2

## SENATE HEARINGS BEFORE COMMITTEE ON APPROPRIATIONS DOD APPROPRIATIONS FOR FY 79, PART 3, pp. 63-64

Senator Stennis: Provide a statement explaining the current DoD policy in determining source of funding for development, test and evaluation efforts, with specific examples of its application.

Mr. Quetsch: As a general rule, RDT&E appropriations fund all costs associated with getting defense weapon systems to the point where they are acceptable as operational systems. This transition point is typified by operational tests by an independent service test activity and a favorable acceptance recommendation.

Examples of these costs include the obvious such as basic and applied research, scientific experiments; a broad range of studies covering engineering, design, feasibility, definition, cost and effectiveness; and exploratory and advanced development efforts which lead to weapon system engineering development. The cost of personnel and their associated support such as tooling and facilities are an integral element of these RDT&E costs.

The costs which are not as obvious, but are nevertheless clearly associated with RDT&E financing include the cost of the service level program management effort including the personnel and facilities required to design, manage, and conduct the test function associated with the development of weapon systems. The cost of nondevelopment end items used in the development and test process are also charged to RDT&E. These costs include the operation of ships and aircraft to conduct realistic tests.

In all instances of major weapons systems, a sufficient number of end items are produced to insure that adequate testing can be completed and that such testing is sufficiently representative of the end item to be produced to provide meaningful operational data.

Items which fall outside of the sphere of RDT&E funding include the cost of construction at government-owned and operated R&D activities. Cost of military personnel involved in R&D activities, cost of construction, operation and maintenance of family housing at R&D activities, cost of test activity related to production acceptance or operational tests to develop or refine employment tactics and doctrine. Also excluded are the expenses of R&D management at DoD component departmental headquarter levels. In all instances, items of inventory that are used in R&D tests and not consumed need not be financed from R&D if they are readily available from inventory.

APPENDIX B, ANNEX 3

# DEPARTMENT OF DEFENSE APPROPRIATIONS FOR 1979

## HEARINGS

BEFORE A

## SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS HOUSE OF REPRESENTATIVES

NINETY-FIFTH CONGRESS

SECOND SESSION

SUBCOMMITTEE ON THE DEPARTMENT OF DEFENSE

GEORGE H. MAHON, Texas, *Chairman*

ROBERT L. F. SIKES, Florida
DANIEL J. FLOOD, Pennsylvania
JOSEPH P. ADDABBO, New York
JOHN J. McFALL, California
JOHN J. FLYNT, Jr., Georgia
ROBERT N. GIAIMO, Connecticut
BILL CHAPPELL, Florida
BILL D. BURLISON, Missouri
JACK EDWARDS, Alabama
J. KENNETH ROBINSON, Virginia
JACK F. KEMP, New York

SAMUEL RALPH PRESTON, JOHN M. GARRITY, PETER J. MURPHY, Jr., DENNIS J. VANDER SCHAAF, GORDON CAMBY, CHARLES W. SNODGRASS, J. DAVID WILLSON, AND JOHN G. PLASHAL, *Staff Assistants*

### PART 3

### MANPOWER OVERVIEW

### RESEARCH AND ENGINEERING PROGRAMS AND SYSTEMS ACQUISITION POLICY

### FY 1978 REPROGRAMING—INERTIAL NAVIGATION SYSTEM

### FY 1978 SUPPLEMENTAL—FOREIGN CURRENCY REVALUATION

WEDNESDAY, FEBRUARY 22, 1978.

# FY 1979 RESEARCH AND ENGINEERING PROGRAMS AND SYSTEMS ACQUISITION POLICY

## WITNESSES

**HON. WILLIAM J. PERRY, UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING**
**ROBERT A. MOORE, DEPUTY UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING (TACTICAL WARFARE PROGRAMS)**
**DR. SEYMOUR L. ZEIBERG, DEPUTY UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING (STRATEGIC AND SPACE SYSTEMS)**
**L. A. KNUTSON, DIRECTOR, PROGRAM CONTROL AND ADMINISTRATION, OFFICE OF THE UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING**
**MAJOR GENERAL STEWART C. MEYER, PROGRAM MANAGER, BALLISTIC MISSILE DEFENSE PROGRAM**
**WILLIAM DAVIS, DEPUTY PROGRAM MANAGER, BALLISTIC MISSILE DEFENSE PROGRAM**

## INTRODUCTION

Mr. MAHON. We will now begin a two-day hearing on the $12.5 billion Fiscal Year 1979 Defense Research Development Test and Evaluation Budget Request.

Dr. Perry, we are pleased to have you before us. We regard you as a man of tremendous background, experience and ability.

The RDT&E budget consists of thousands of individual projects. It is impossible, of course, for this committee to review each and every one of the projects.

We would like for you, Dr. Perry, to provide an overview of the entire RDT&E program and then we will discuss some of the more controversitl projects, some of the more significant projects.

We know much of the testimony will necessarily have to be off the record but I think we can proceed for a while and we can take steps later to close the meeting.

Will you proceed, Dr. Perry. . . .

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INAPPROPRIATE BUDGETING OF RESEARCH AND DEVELOPMENT EFFORTS

Mr. ADDABBO. For the past several years, the Committee has questioned the Department's policy of budgeting programs for manufacturing technology, component improvement, producibility, reliability, availability, maintainability, etc., in the procurement appropriation. For the most part, the Committee believes that these programs are essentially research and development in character and should be funded in the research appropriations of the various services. This year, the Department has again proposed to budget these programs in the procurement appropriation. Provide for the record, by appropriation, budget activity, and line number, and cost, the amounts requested for these programs in fiscal year 1979. Please justify the continued insistence on budgeting these programs in the procurement appropriation.

[The information follows:]

The Manufacturing Technology Program improves productivity and reduces procurement costs during production. It exploits previously developed production techniques, processes, materials and equipment. It does not develop new technology, and it does not modify end item design or performance characteristics. Centralized management avoids duplication of effort among weapon systems procurement programs and increases both DOD and Congressional visibility.

Funding policy has been reviewed as a result of the Committee's concern. Transfer to the research and development appropriation is not appropriate for several reasons. The program is strictly oriented to factory floor activities during production. It applies to procurement of items qualified for production by several different research and development programs, and to the reprocurement of items long since out of research and development. Industry includes the cost of such activities in procurement overhead, and if funding were not centrally managed, these charges could appear more than once in the procurement cost of several different items.

Therefore, the DOD believes that it is both appropriate and cost effective to finance this program with procurement appropriations. Funding for Fiscal Year 1979 is as follows:

*Fiscal year 1979—Manufacturing technology program*

| Appropriation and activity: | *Millions* |
|---|---|
| (1497) Aircraft, Army—4-support equipment and facilities | $7.1 |
| (2597) Missiles, Army—5 support equipment and facilities | 6.6 |
| (3197) Weapons and Tracked Combat Vehicles, Army—1-tracked combat vehicles | 4.5 |
| (3297) Weapons and Tracked Combat Vehicles, Army—2-weapons and other combat vehicles | 3.2 |
| (4932) Ammunition, Army—2-production base support | 28.2 |
| (5197) Other, Army—1-tactical and support vehicles | 1.0 |
| (5297) Other, Army—2 communications and electronics | 8.2 |
| (5397) Other, Army—3-other support equipment | 12.1 |
| (3010) Aircraft, Air Force—1400-industrial facilities | 19.4 |
| (3020) Missiles, Air Force—2400-industrial facilities | 5.0 |
| (3080) Other, Air Force—846610-industrial facilities | 2.7 |
| (322) Other, Navy—7-personnel and command support equipment | 13.3 |

Component Improvement Program (CIP) provide early disclosure of weaknesses that would normally appear only after extended field operation. This is necessary because some design deficiencies cannot be found until the engine has been in operation longer than the development test program permits, because material and manufacturing defects are introduced during production, and because maintenance and repair in the field are less than perfect. These problems are essentially related to production, procurement and field service rather than to research and development. Therefore, efforts to resolve them are properly financed outside of the research and development appropriation.

Any engine improvements to increase the performance envelope are financed from research and development appropriations. This is as it should be, since inherent performance is not degraded during production and deployment.

These policies are in accordance with the DOD Budget Manual, and they were discussed with the Committee in conjunction with Fiscal Year 1979 budget review. Fiscal Year 1979 financing is as follows:

| | Activity | Line No | Cost (millions) |
|---|---|---|---|
| Aircraft procurement | | | |
| Army | 4 | 24 | $11.0 |
| Navy | 7 | 61 | 56.4 |
| Air Force | 7 | 45 | 110.0 |

Producibility is a DoD policy rather than a separate program. System designs are challenged during the Demonstration and Validation Phase to ensure they can be economically manufactured. Producibility Engineering and Planning (PEP) and Production Readiness Review (PRR) are required before commitment to production. These are specific steps in a system development program, and they are financed from research and development appropriations.

There are no generic Reliability, Maintainability or Availability programs in the Fiscal Year 1979 procurement appropriation. Activities that relate to these characteristics of specific weapon systems are properly funded in research and development insofar as they address the detection and correction of design deficiencies. They are funded in procurement when they address problems introduced during production (material and manufacturing defects). They are funded with operating and maintenance appropriations when they address problems introduced after production (imperfect maintenance and repair).

Experience does not support the position that all or even most of these problems can be avoided during research and development. Cost effective use of the various appropriations does not indicate that research and development funds should be applied to resolve all problems that are introduced during later phases of the life cycle.

Mr. ADDABBO. If the research and development program for weapons systems included as an inherent part emphasis on reliability, maintainability, availability, etc., there would be a far lesser need for component improvement, PRAM, and other such programs once a weapon system is in production. Can you identify any specific weapons system currently in development where such an emphasis is being made?

Dr. PERRY. We will be happy to provide those answers for the record, but let me give you a brief comment on them right now.

I have transferred supervision of this manufacturing technology, in fact, to our Research and Advanced Technology Office and we will reexamine the question of which account it most appropriately appears in. I think that is a very good question and I will expand my answers for the record.

[Additional information follows:]

Many design deficiencies can be avoided or corrected during research and development, but it is impossible to eliminate them entirely. Material and manufacturing defects are introduced during production. Additional problems are introduced by imperfect maintenance, repair and replacement parts. Therefore research and development cannot substitute for vigorous improvement programs during production and early deployment.

Emphasis on early detection and correction of design deficiencies is being increased by a new directive on reliability and maintainability, now in preparation. The directive also increases emphasis on detection and correction of defects during production. This more sharply focused approach is being applied as system programs come up for review. Examples include the advanced attack helicopter, the F-18 aircraft, and the F-16 radar. These systems should need somewhat less improvement than their predecessors, but improvement programs will still be necessary.

The Air Force "Productivity, Reliability, Availability and Maintainability (PRAM)" program is another matter altogether. It did not address systems in production or early deployment. It went after the readiness and ownership cost problems of older systems and equipment. Operating and maintenance (O&M) funds were used to isolate field service problems, to improve maintenance and repair productivity, and to incorporate proven modifications. Procurement funds were used to obtain previously developed items as off-the-shelf replacements for electronic tubes and similar pieces of twenty-five year old technology. And a small amount of research and development funding was used where off-the-shelf procurement was not suitable. This was a highly successful program when it was allowed to make cost effective investments from three appropriations. However, Committee insistence that it be financed as though it were entirely research and development has effectively killed the PRAM program and negated efforts to establish similar efforts in the other military departments. . . .

APPENDIX B, ANNEX 4

EXTRACTS FROM DOD BUDGET GUIDANCE MANUAL (DOD 7110-1-M);
PART II - BUDGET FORMULATION; SECTION 5 - RESEARCH DEVELOPMENT,
TEST AND EVALUATION; CHAPTER 251 - DEFINITIONS, POLICY AND CRITERIA

251.3 Policy

A. R&D programs and the cost coverage of RDT&E appropriations will be based on the principles set forth in DoD Directive 7000.1. The costs of military personnel assigned to R&D tasks will be included as unfunded costs in the R&D program in accordance with DoD Instruction 7220.15. RDT&E appropriations will provide for:

1. The costs of research, development, test and evaluation activities performed by contractors and government installations, including procurement of equipment and materiel required for development of equipment or materiel, its Development Test and Evaluation (DT&E); and its Initial Operational Test and Evaluation (IOT&E) as provided for in paragraph 251.4.A.1.d. below;

2. The operation of R&D installations or similar activities engaged in the conduct of the R&D program including (a) direct and indirect efforts, (b) elements of expense, and (c) elements of investment cost as defined in DoD Instruction 7220.24;

* * *

251.4 Criteria

Costs that are to be financed by RDT&E appropriations and costs that are to be financed by other appropriations are distinguished below. Generally, all RDT&E-related effort should be funded in the RDT&E appropriations so that it can be assessed from a priority standpoint with other research and development programs. Grey areas are to be resolved in favor of RDT&E funding.

A. The Types of cost to be financed by RDT&E appropriations are:

1. Contractual services and other costs for:

a. The conduct and support of R&D, including basic research; applied research; theoretical studies; scientific experiments; feasibility studies; design studies; engineering studies; related weapons systems; operational and cost/effectiveness studies and analyses; definition studies; exploratory development; advanced development. Consumption of supplies and material and purchase of equipment or instrumentation are included.

b. The development, engineering, design, purchase, fabrication, or modification of experimental development, test, evaluation, or prototype articles, including end items, weapons, equipment, components, or material; and other items required to support testing, in the quantities required for the conduct of approved research, development, or development test and evaluation programs, including any related design and manufacturing engineering, tools, tooling and facilities necessary for the fabrication of a specific article under realistic conditions essential for reliable test results leading to approval of the end product for operational use.

* * *

f. The development, design, purchase, installation, and acceptance testing (in place when appropriate) of equipment or instrumentation required for research, development, test, and evaluation activities.

* * *

3. Costs of end items, weapons, equipment, components, materials and services required for research, development, and development test and evaluation activities.

4. Expenses and investments for the operation and maintenance of R&D organizations, facilities, equipment (including R&D aircraft, ships and ship-type vehicles); and installations/activities (including those operated by contract) which are engaged in research, development, development test and evaluation; or primarily engaged in the management, administration, or the direct support thereof, including Commands but excluding administrative salaries and expenses of R&D organizations within the Departmental Headquarters level of DoD Components (Office of the Secretary of Defense, Departments of the Army, Navy and Air Force, and Defense Agencies). Construction and operation and maintenance of family housing at R&D installations/activities are excluded.

* * *

B. The types of cost to be financed by other appropriations are:

* * *

4. Conduct of testing that is not associated with R&D, such as:

a. Acceptance, quality control and surveillance testing of articles obtained for other than R&D purposes.

b. Routine testing in connection with logistic support.

c. Testing related to the operation and maintenance of equipment and material acquired for use under appropriations other than R&D.

* * *

10. Costs of evaluating organizational structure and distribution of function, administrative operating policies, procedures, methods and systems (management studies) and applications of the management sciences to improve effectiveness in carrying out assigned functions are to be financed from the Operations and Maintenance appropriations.

* * *

C. Special Situations.

The appropriate appropriation for items falling in some of these categories, as well as what may constitute a realistic number of test articles for major developments, will depend upon the actual program circumstances involved for each case for each annual Program/Budget cycle. Therefore, each Program/Budget proposal made in accordance with these instructions will be subject to review and determination.

* * *

3. "Product improvement" of major end items and major components of major end items except "component improvement" which is addressed in paragraph 10 below, currently in production or in the operational inventory is subject to the following:

a. Redesign of an item for the purpose of extending the useful military life of such item by increasing the then current performance envelope, including related development, test and evaluation effort, will be financed by RDT&E appropriations.

b. Engineering services and related effort by the producing contractor or manufacturing installation, applied to an item currently in production for the purpose of extending the useful military life of such items within the then current performance envelope, should be funded by Procurement appropriations.

c. Engineering services and related effort by a manufacturing or operations type installation, applied to an item no longer in production but still in the operational inventory for the purpose of extending the useful military life of such item within the then current performance envelope, should be financed by Operations and Maintenance appropriations.

* * *

9. Automatic Data Processing Costs:

a. RDT&E Funded Facilities: Funds required for the operation of ADP units at RDT&E funded facilities and for the acquisition of ADP resources, including development, lease or purchase of Automatic Data Processing Equipment (ADPE) by such ADP units should be financed by RDT&E. (See Chapter 2.B.2.)

* * *

10. Component Improvement. Component improvement costs are programmed in the Procurement appropriation to provide for continuing improvements in aircraft engines in the areas of reliability, maintainability, durability, correction of Service-revealed deficiencies, time-between-overhaul, etc. The term "Component Improvement" does not apply to the design, development, engineering and test effort required to bring an aircraft engine to the point of initial production suitability. It also does not apply to efforts subsequent to initial production suitability which are designed to increase the engine performance envelope. Both of these types of effort shall be RDT&E-financed.

* * *

APPENDIX B, ANNEX 5

EXTRACTS FROM AR 37-100-80, THE ARMY MANAGEMENT STRUCTURE
CHAPTER 7, RDTE

Types of costs to be funded by the RDTE appropriation:

1. *The accumulation of data for manuals and development of human factors data such as task and skill analyses, position descriptions, and numbers and aptitudes of personnel required to operate and maintain equipment for systems being developed. Includes cost associated with the preparation and conduct by civilians (sic) contractor/developers of short non-technical orientation courses for interested staff personnel which are scheduled during the research and development cycle as soon as the development progress on new equipment indicates probable Army acceptance. Provides for contractor training of initial service test teams to include travel and per diem of civilian and military personnel employed as members of such teams. Includes logistic support analysis and evaluation of logistic support elements, such as repair parts data, equipment publications, support equipment data, and reliability/maintainability data for those systems and equipment being developed.* (Chapter 7, Paragraph A.7.)

2. *Producibility Engineering and Planning (PEP). PEP measures undertaken by the materiel developer to assure producibility of materiel prior to quantity procurement will be funded by the RDTE appropriation.* (Chapter 7, Paragraph C.10.)

3. *Studies and Analyses. Those studies and analyses that support Research and Development activities, such as research, technology exploration and development, systems and equipment analyses, and development effort including development and test of initial tactics and doctrine will be programed and budgeted in RDTE. In those cases where a clear determination is not possible based on the above, then the guideline will be to fund such studies and analyses in RDTE if the sponsoring organization is a part of the R&D Community at the ASD level, in the Military Departments, Defense Agencies, or R&D staff headquarters levels. All other studies and analyses will be programed and budgeted in O&M.* (Chapter 7, Paragraph C.11.)

APPENDIX B, ANNEX 6

EXTRACTS OF DARCOM SUPPLEMENT 1 TO AR 37-100-80, PARAGRAPH 2-3

2-3. Selected funding guidance. The paragraphs below provide summarized funding guidance in key areas that cut across appropriation lines. It should be understood that the summary guidance statements contained herein are not complete in their coverage and augment policies and procedures contained in AR's, DARCOM-R's/AMCR's, and other official publications.

* * *

c. Value engineering. In accordance with DODI 7110.2 and AR 5-4, Budget Guidance for Value Engineering, the appropriation financing the prime value engineering program bears the costs of value engineering actions. Value engineering performed during design and development is funded from Research, Development, Test and Evaluation (RDTE). Value engineering performed on items in production or in inventory may be funded from RDTE, OMA, or PA. If the effort requires redesign entailing development, test, and evaluation work that increases the current performance envelope, RDTE is charged. In all other cases, the prime benefiting program finances the effort.

* * *

g. Program/project/product managers (PM's). Program/project/product managers' expenses are charged as indicated below. As a guide, use DARCOM-R 37-17.

(1) When the PM's activity is identified solely with RDTE projects, the benefiting project, or projects, pays all costs.

(2) When the PM's activity relates solely to a procurement item and the Army Industrial Fund (AIF) is not involved, the costs are split between PA and OMA. Pay of personnel (including related costs, e.g., travel, supplies, etc.) performing OMA-type work such as contract administration, central supply activities, maintenance engineering, etc., will be charged to OMA. Pay of personnel (including related support costs) performing production engineering will be initially charged to OMA (PE 728012.16) and reimbursed by the applicable procurement appropriation. At AIF installations, PA will pay for costs of production engineering functions.

(3) When the PM's activity relates to both RDTE projects and procurement items, costs are divided among RDTE, OMA, and PA. The basis for dividing the costs is similar to that just described for the PM activity that relates solely to RDTE or solely to procurement.

* * *

h. Technical data packages. Depending on the particular life cycle phase in which an item of equipment is presently located, the cost of gathering source data, developing, producing, publishing, or processing maintenance support materiel, equipment and technical publications, and other documentation considered to be part of the technical data package (TDP) which is needed to support an item of equipment throughout its life cycle, will be financed as described below. Such efforts may commence with the original development of the item and progress through various other life cycle phases such as producibility engineering and planning, updating of the technical data package during or subsequent to production, and if necessary, reconfiguration. The above documentation may include, but is not limited to, drafts and printer's copies of specifications,; engineering drawings; art work; standards; technical manuals/documents which may consist of draft operation instructions, maintenance and overhaul manuals, lube charts/parts/special tool/test equipment manuals or lists, supply publications and catalogs, etc.:

(1) The cost of accumulating necessary source data, developing, preparing, and revising (or procuring from commercial sources)

preliminary and final draft manuscripts (i.e., printer's copies) pertaining to a specific item of equipment that is under development, including operational systems development, will be charged to the RDTE Appropriation. Those RDTE funds provided to design, develop, engineer, build the development prototype, test and evaluate it, also should be used to finance the cost of obtaining (by contract or organically) those documents described above that are needed prior to adoption or type classification of the item.

(2) Should it become necessary following adoption or type classification of the item, to make any manuscript revisions resulting from a production engineering action, the costs of accomplishing such revisions are properly chargeable to procurement funds (i.e., engineering in support of production) if the item is scheduled to be provided by PA, or to OMA Production Engineering funds (728012.12) if the item is to be procured by the ASF.

(3) The cost of preparing preliminary and final draft changes, revisions or additions to equipment documentation that are necessitated by a reconfiguration action will be financed with the same funds (i.e., RDTE, or PA, or ASF or OMA 738017.000QX) authorized to finance the first phase reconfiguration effort of the item undergoing product improvement (see chap 4, AR 70-15).

(4) In the event it becomes necessary subsequent to initial procurement to change or revise an equipment document pertaining to an item that is not scheduled for product improvement (i.e., reconfiguration), such action will be recognized as an update of the Technical Data Package/Maintenance Support Plan, that comes within the purview of engineering in support of production or subsequent thereto, and financed as follows:

(a) Updating of technical data packages pertaining to type classified/adopted parts, components, assemblies, and end items, which are currently under procurement/production by PA will be programed, budgeted and charged to those procurement accounts that provide for procurement, manufacture, or remanufacture of such items. Should it become necessary to expend any commodity command in-house resources to accomplish the above effort, such costs will be accounted for by the performing commodity command in OMA account 728012.16, that will be reimbursed with procurement funds available to the equipment proponent. However, when RDTEA resources are employed to provide this support, OMA 728012.16 account will not apply. Automatic reimbursement procedures will be applied in RDTE from PA without intermediary impact on the OMA 728012.16 account.

(b) Updating actions directed to procurement appropriation type components, parts, assemblies, or end items that are out of production will be programed, budgeted, and charged to OMA (AA 738017.000RO).

(c) Production engineering updating actions directed to stock fund type end items or uninstalled components, parts, assemblies, etc., being held in stock fund-owned inventory will be programed, budgeted and charged to OMA (728012.12), regardless of the fact that such items are in production or out-of-production.

(5) Technical data or literature required to support the evaluation and testing of commercial items to determine their suitability for military application will be developed or procured with the same type of MACI funds (OMA, or PA, or RDTE) programed to support the actual evaluation and/or test (see chap 5, 6 and 7, basic reg).

(6) At local level (i.e., MSC), mass procurement from commercial sources or publication (i.e., printing) which results from approval of final draft manuscript (produced as described above) will be financed with OMA (738017.000RO) funds available to the agency responsible for the procurement of the item to which such documentation pertains. Unless a vendor of a commercial item being procured for operational use is willing to furnish publications pertaining to said items without cost to the Government, then the purchase or printing costs of such publications must

be financed by OMA 7M. Reference paragraph 3-11b, AR 700-90. At DA level, mass publication and distribution of equipment documents is financed with OMA 7M funds made available by DCSLOG to TAGO. Excludes first edition maintenance publications, and revisions or changes thereto during production phases that are charged to PA.

(7) The costs of developing general maintenance concepts, content, formats, etc., that are not oriented towards a specific item of hardware but may be included, if needed, in any maintenance support material or equipment publication, will be charged by the NMP to OMA (738017.000PX). Also chargeable to OMA (738017.000PX) are those expenses generated by the NMP in performing the necessary review and edit functions to insure that specifications pertaining to content and format of item oriented documentation have been complied with.

* * *

APPENDIX B, ANNEX 7

EXTRACTS FROM LETTER, DRCPA-O, 21 JUNE 1977,
SUBJECT: LETTER OF INSTRUCTION, AVIATION RESEARCH AND DEVELOPMENT COMMAND (AVRADCOM)/TROOP SUPPORT AND AVIATION MATERIEL READINESS COMMAND (TSARCOM)

1. Reference is made to:

a. Concept Study for the Aviation Development Center, dated January 1976.

b. Concept Study for the Troop Support and Aviation Command, dated January 1976.

c. DARCOM-R 70-1, Transition of Management Responsibilities from a Research and Development Command Manager to a Materiel Readiness Command Manager, dated 28 June 1976.

2. PURPOSE. The above referenced concept studies presented the general operational and procedural concepts the AVRADCOM and the TSARCOM would use in the performance of their missions. This Letter of Instruction (LOI) sets forth the item/system management responsibilities for both the AVRADCOM and the TSARCOM for their portion of the life cycle of materiel items/systems. The AVRADCOM mission includes the provisions required to manage and control the aviation materiel development and acquisition process while the TSARCOM mission provides for complete and independent management of logistics functions for assigned materiel.

3. OPERATIONAL INSTRUCTIONS.

a. General.

(1) Every item, system, or equipment (hereafter referred to as item) managed by the US Army Materiel Development and Readiness Command (DARCOM), shall be assigned for management purposes to either a Program/Project/Product Manager (PM) or the Commander of a Research and Development (R&D) Command or a Materiel Readiness Command. (It is imperative that all who would understand this policy document note carefully that it keys not on who performs the function or even particularly where the function is performed, but who is responsible for managing the item). Support of the designated manager will

be requested from and provided by any number of activities outside of the assigned organization. The designated manager shall be responsible and accountable for all activity related to an assigned item notwithstanding the source of program support.

* * *

(4) Transition, for management purposes, will occur at the earliest practicable time. In the event an item is not transitioned at an approved Transition Date, the responsibility for clearly establishing that the transition should not take place will rest with the manager who opposes the Transition. The item Transition Date shall have been established by not later than six (6) months following entry into full scale development. The criteria to be considered in arriving at a Transition Date are in reference c.

(5) The AVRADCOM shall budget for all programmed requirements prior to the established Transition Date and the TSARCOM for all programmed requirements after the Transition Date.

* * *

g. Engineering.

(1) The AVRADCOM is responsible for all engineering tasks and functions leading to timely initial quantity production, and that impact on design integrity or performance of assigned items/systems. After an item has transitioned to the TSARCOM, the TSARCOM will task AVRADCOM to accomplish required engineering.

(2) The engineering functions to be performed by AVRADCOM are based upon engineering-design interrelationships and the need to assure life cycle integrity including initial production engineering. The engineering functions to be performed by the TSARCOM are intended to support its inherent materiel readiness mission responsibilities (i.e., primarily follow-on production and long-term logistical support). For TSARCOM procurements, the organic engineers provide a technical interface with the contractor in the identification and resolution of technical problems. Those problems that relate to design integrity will be cause to bring AVRADCOM engineering capability to bear. Thus, a TSARCOM-to-AVRADCOM engineering interface is necessary.

(3) For fielded items/systems, the TSARCOM has an engineering capability to accomplish minor modifications (AR 750-1), maintenance engineering, value engineering, production and industrial engineering, and to provide a field service engineering capability to investigate technical problems and assist users. The TSARCOM will serve as the point of contact for Army Field Commanders in the resolution of problems on fielded systems. Design integrity problems uncovered through field experience will be referred to AVRADCOM for resolution. The TSARCOM will provide AVRADCOM with data for PIPs, i.e., failure data, repair parts usage, etc. Minor modifications that do not affect design and that involve little engineering and testing, shall be handled by the TSARCOM as engineering change proposals (ECPs), and processed through the Configuration Control Board.

h. Product Assurance.

* * *

(3) The AVRADCOM will act as the materiel release proponent for items procured prior to transition and the TSARCOM will be the release proponent on items procured after transition. Regardless of the proponent, all releases will be coordinated between both activities. The AVRADCOM will provide laboratory support to the TSARCOM for the purpose of in-house conducted production and post-production tests. Both organizations must work in concert to satisfy the quality requirements for the development phase and to provide continuous quality management throughout the product life cycle.

* * *

j. Technical Data Package (TDP). Airworthiness, design integrity, and currency of the TDP will remain the responsibility of the AVRADCOM throughout the item life cycle. The management and administrative control of the TDP will transition from the AVRADCOM to the TSARCOM at the time of item/system transition. All changes to the TDP (ECPs, deviations, waivers) will be processed through configuration management procedures (paragraph 3f).

k. Defense Standardization Program. The AVRADCOM will be the proponent for DOD standardization for designated federal supply classes. The AVRADCOM will interface with and receive support from the TSARCOM in the conduct of this task.

* * *

6. FUNCTIONAL RESPONSIBILITIES REQUIRING INTERFACE.

a. Product Improvement. The AVRADCOM has the mission of product improvement as the viable technical alternative to the development of new/replacement items. The TSARCOM is responsible to provide data justification in the area of failure/maintenance support data, repair parts usage, etc., (Equipment Improvement Reports (EIRs), Equipment Performance Reports (EPRs), Not Operationally Ready - Supply (NORS), Not Operationally Ready - Maintenance (NORM)) to support improvement proposals as they evolve (see paragraph 3g). The TSARCOM has responsibility for management of PIPs on items that have been transitioned. The AVRADCOM has responsibility for management of PIPs on items that have not been transitioned.

b. Integrated Logistic Support (ILS).

(1) Management of Integrated Logistic Support.

* * *

(c) Both the TSARCOM and the AVRADCOM perform a vital role in ILS (DARCOM Supplement 1 to AR 700-127). The AVRADCOM Commander and his PMs are responsible for overall planning and scheduling of ILS and for insuring that all ILS events are integrated into item/system development. The TSARCOM Commander is responsible for insuring that the ILS concept is compatible with the logistics structure of the Army. The TSARCOM Commander is responsible for detailed input to ILS planning and for implementation of ILS. This will require continuous coordination between the AVRADCOM/PMs and the TSARCOM on an individual ILS event basis.

* * *

(4) Publications. The AVRADCOM/PM is responsible for planning and scheduling technical manuals and publications to include repair parts lists, maintenance allocation charts, instructional manuals, lubrication orders, operational manuals, etc. The TSARCOM is responsible for preparing, acquiring, and maintaining current equipment operational and technical publications which cover technical operation, maintenance and repair parts support of materiel. The AVRADCOM/PM and TSARCOM will maintain a continuous publications interface during the materiel life cycle to insure that equipment publications are developed, published, and distributed for each item of significance introduced into the operational inventory.

(5) Maintainability and Maintenance Engineering. The AVRADCOM/PM is responsible for maintainability engineering to insure airworthiness, design, test, and production of equipment that is operable and maintainable by individuals possessing common skills, aptitudes and education levels. The AVRADCOM/PM must insure that the equipment is logistically supportable, and cost and operationally effective. The AVRADCOM/PM will initiate and develop the life cycle audit trail of performance and support parameters, and extend it through development and operational testing to Transition. The TSARCOM is responsible for maintenance engineering to insure the provision of maintenance concepts, experience data, and recommended parameters and criteria regarding maintainability and reliability as maintenance support guidance to the design process for use in design trade-offs and risk analysis, and for use in developing a logistic support capability responsive to operational requirements of the item/system. The AVRADCOM/PM and TSARCOM will maintain a continuous interface in all phases of the acquisition process for new weapons and equipment to assist in the achievement of operational readiness goals at minimum total ownership costs.

* * *

(7) Equipment Improvement Report (EIR). EIRs will be forwarded by the user to the TSARCOM. When failures reported in EIRs are on those items/systems for which the AVRADCOM/PM is responsible, those EIRs will be passed directly to the AVRADCOM/PM. After the item/system has transitioned and failures reported in EIRs are the result of design deficiencies, EIR evaluation will be assigned to the AVRADCOM as a task assignment from the TSARCOM. EIR solutions which require changes to the configuration of the item/system will be implemented and controlled by the Configuration Control Board.

h. Product Assurance.

* * *

(3) The AVRADCOM will act as the materiel release proponent for items procured prior to transition and the TSARCOM will be the release proponent on items procured after transition. Regardless of the proponent, all releases will be coordinated between both activities. The AVRADCOM will provide laboratory support to the TSARCOM for the purpose of in-house conducted production and post-production tests. Both organizations must work in concert to satisfy the quality requirements for the development phase and to provide continuous quality management throughout the product life cycle.

* * *

j. Technical Data Package (TDP). Airworthiness, design integrity, and currency of the TDP will remain the responsibility of the AVRADCOM throughout the item life cycle. The management and administrative control of the TDP will transition from the AVRADCOM to the TSARCOM at the time of item/system transition. All changes to the TDP (ECPs, deviations, waivers) will be processed through configuration management procedures (paragraph 3f).

k. Defense Standardization Program. The AVRADCOM will be the proponent for DOD standardization for designated federal supply classes. The AVRADCOM will interface with and receive support from the TSARCOM in the conduct of this task.

* * *

6. FUNCTIONAL RESPONSIBILITIES REQUIRING INTERFACE.

a. Product Improvement. The AVRADCOM has the mission of product improvement as the viable technical alternative to the development of new/replacement items. The TSARCOM is responsible to provide data justification in the area of failure/maintenance support data, repair parts usage, etc., (Equipment Improvement Reports (EIRs), Equipment Performance Reports (EPRs), Not Operationally Ready - Supply (NORS), Not Operationally Ready - Maintenance (NORM)) to support improvement proposals as they evolve (see paragraph 3g). The TSARCOM has responsibility for management of PIPs on items that have been transitioned. The AVRADCOM has responsibility for management of PIPs on items that have not been transitioned.

b. Integrated Logistic Support (ILS).

(1) Management of Integrated Logistic Support.

* * *

(c) Both the TSARCOM and the AVRADCOM perform a vital role in ILS (DARCOM Supplement 1 to AR 700-127). The AVRADCOM Commander and his PMs are responsible for overall planning and scheduling of ILS and for insuring that all ILS events are integrated into item/system development. The TSARCOM Commander is responsible for insuring that the ILS concept is compatible with the logistics structure of the Army. The TSARCOM Commander is responsible for detailed input to ILS planning and for implementation of ILS. This will require continuous coordination between the AVRADCOM/PMs and the TSARCOM on an individual ILS event basis.

APPENDIX B, ANNEX 8

EXTRACTS FROM MIRADCOM ORGANIZATION, MISSION AND FUNCTIONS MANUAL (MICOM-R 10-2, VOLUME II, 1 JULY 1979)

1. Technology Laboratory.

Mission.... *Perform selective research and component development to generate new technology, reduce missile development lead time, and improve reliability. Assure intersystem transfer of technology, including from current to future systems.... Serves as DARCOM Lead Laboratory for Guidance and Control/ Terminal Homing.* (Paragraph 11-1a.)

2. Engineering Laboratory.

Mission.... *As the centralized test element, develop and implement comprehensive test policy and plan, conduct and evaluate integrated test programs for MIRADCOM/MIRCOM. Design, maintain and operate centralized test facilities for experimental, development, production and surveillance tests.... Provide staff management and execution of Configuration Management, System Engineering, Technical Data Management, Value Engineering, Production Engineering and Product Improvement Programs. Provide the MIRADCOM/MIRCOM central point of contact for management of the DOD and International Standardization programs and Manufacturing Technology for assigned materiel....* (Paragraph 13-1.a.)

3. Product Assurance Directorate.

Mission.... *To plan, develop, manage, and conduct comprehensive product assurance programs for assigned MIRADCOM materiel. Product assurance for the MIRADCOM includes... quality engineering (to include...technical data packages... statistical quality analysis); product quality analysis and liaison operations....* (Paragraph 15-1.a.)

APPENDIX B, ANNEX 9

EXTRACTS FROM WORKING RELATIONSHIP AGREEMENT
BETWEEN MIRCOM AND MIRADCOM

*MIRADCOM will provide support to MIRCOM as follows:*

1. *Scientific and engineering in-house laboratory capability. Provide scientific and engineering in-house laboratory support on a funded work order basis and with a priority rationale in keeping with the requesting weapon/equipment system DA/DOD priority.* (Paragraph G.6.)

2. *Reliability Data Central Services. Directorate for Product Assurance, MIRADCOM, will provide MIRCOM elements support in the areas of the Failure Rate and Failure Experience Data Banks..., Components Storage Reliability Data, Reliability Analysis Center (RAC) Data, and other required reliability data research services, on request of the Project Manager, Functional Director or his authorized representative.* (Paragraph G.7.)

3. *Initially furnish and update of any type documentation on which MIRADCOM expects to receive repository services.* (Paragraph B.4. of Supplement No. F.1. which deals with the Technical Data Repository.)

4. *Program planning, budgeting and funding for Budget Program 730000 for both MIRCOM and MIRADCOM requirements will be the responsibility of MIRCOM. All BP 730000 funds will be received and issued as required by MIRCOM.* (Paragraph B.1.b. of Supplement No. F.2. which deals with Programming, Budgeting and Funding.)

APPENDIX B, ANNEX 10

EXTRACTS FROM AVRADCOM ORGANIZATION, MISSION AND FUNCTIONS MANUAL (AVRADCOM-R 10-1, 1 JULY 1977)

1. Director of Plans and Analysis.

Mission.... *To manage the Command's Operations Research/ Systems Analysis (ORSA) and Cost Analysis Programs.... To manage and direct the Command's force development program for HQ, AVRADCOM, and assigned subordinate elements and Project Manager Offices, including mission, organization, manpower control and utilization. Provide ILS Planning for the Command.* (Paragraph 9-1.)

2. Product Assurance Directorate.

a. Director of Product Assurance.

Mission.... *Direct and control the planning, development and implementation of AVRADCOM Product Assurance policy, plans, programs and procedures as they apply to reliability and maintainability (RAM), quality engineering, materiel release and quality technology for development and initial production of AVRADCOM assigned materiel....* (Paragraph 10-1.)

b. RAM/Assessment Division.

Mission.... *Provide RAM and system assessment technical expertise for AVRADCOM. Provide RAM support to the colocated DARCOM Project Managers for all phases of the life cycle.* (Paragraph 10-4.a.)

Functions.... *Provide RAM support for AVRADCOM Hardware Product Improvement Programs, including evaluation of R&M impact of proposed configuration changes and R&M inputs to the economic analysis.* (Paragraph 10-4.b.(15).)

3. Director of Development and Engineering.

Mission.... *To manage that portion of the AVRADCOM lead command mission which is concerned with development and engineering... plan and supervise the accomplishment of TRADOC and ASA requirements for aviation and airborne systems;...provide guidance to participating DARCOM development commands, AVRADCOM activities*

*and external agencies and consolidate program and funding requirements for assigned engineering, development and test efforts;....* (Paragraph 12-1.)

NOTE: This directorate has now been split into two directorates, namely the Systems Engineering Directorate and the Development and Qualification Directorate, but the missions and functions are basically unchanged.

a. Systems Development and Qualification Division.

Mission.... *Develop and manage the Army Airworthiness Qualification Program, and the Aeronautical Design Standards Program. Manage assisted development programs, assist other Command managers with development programs and exercise responsibility for all Command qualification of components, sub-system and aircraft systems whether through development or product improvement programs. Prepare and issue airworthiness releases, interim and final qualification statements, together with necessary flight envelope, operating instructions, and service life of parts....* (Paragraph 12-5.)

b. Operational Systems Division.

Mission.... *Provide engineering support for major Product Improvement Programs (PIP's)/Engineering Change Proposals (ECP's) when tasked by TSARCOM in support of transitioned (fielded) aircraft systems and related equipment. Initiate and provide New Equipment Training (NET) planning and scheduling and the design and acquisition of training devices. Manage aviation related electronics systems during production and operational phases of the aircraft system.* (Paragraph 12-7.)

4. Avionics Research and Development Activity.

Mission.... *Conduct that portion of Aviation Research and Development Command (AVRADCOM) mission pertaining to avionics.... Responsible for planning and conducting development, initial production, and product improvement of applicable items/systems, and provide technical support throughout the system's life cycle.* (Paragraph 14-1.a.)

5. US Army Plant Representative Office, Hughes Helicopters-Summa Corporation.

Mission.... *To perform all field service functions for Army and other Government contracts awarded to..., including but not limited to field contract administration, engineering, property administration, flight acceptance and movement of materiel to consignee agencies, mobilization and production planning, expediting and progressing, shipping, inspection and acceptance, contract termination, and quality assurance.* (Paragraph 19-1.a.)

APPENDIX B, ANNEX 11

EXTRACTS FROM THE TARADCOM ORGANIZATION, MISSION
AND FUNCTIONS MANUAL
(TARADCOM-R 10-3, 10 MAY 1978)

1. Integrated Logistics Support Office (DRDTA-H).

Mission.... *To exercise control over all interface and planning actions with TARCOM, other development/materiel readiness commands and higher headquarters relating to Integrated Logistics Support (ILS) actions for assigned systems.* (Chapter 9, Paragraph 2.)

2. Tank-Automotive Systems Laboratory (DRDTA-R).

Mission.... *To plan, direct and execute Product Improvement Programs for which the command has been given mission responsibility.* (Chapter 14, Paragraph 2.)

*To provide support to project and product managers.* (Chapter 14, Paragraph 3.)

*To manage the Value Engineering (VE) Program for the Command....* (Chapter 14, Paragraph 10.)

3. Directorate for Product Assurance (DRDTA-J).

Mission.... *To plan, develop and manage the Tank-Automotive Research and Development Command Product Assurance Programs including:...Quality engineering services and technical data for weapons systems research, development, initial production, modification, rebuild and overhaul of assigned materiel.* (Chapter 18, Paragraph 1.)

APPENDIX B, ANNEX 12

EXTRACTS FROM THE INTRASERVICE SUPPORT AGREEMENT (W56HZX-78248-001) BETWEEN THE US ARMY TANK-AUTOMOTIVE RESEARCH AND DEVELOPMENT COMMAND AND THE US ARMY TANK-AUTOMOTIVE MATERIEL READINESS COMMAND

1. After transitioning, in the area of APA Engineering Services,

TARADCOM will:

*Include TARCOM Requirements in PIP and RDT&E programs and budget. Provide program guidance on objectives and scheduling of assigned projects and tasks. Issue program through use of reimbursement orders by OMA, APA and RDT&E, A program line.* (Section B, page 16.)

2. After transitioning, in the area of Technical Data Packages,

TARADCOM will:

*Provide TDP control to TARCOM with allowance for sufficient procurement administrative leadtime to insure that contract award can be made in the programmed fiscal year. Prepare, coordinate and collate technical documentation, if necessary, for TARCOM to conduct type classification IPR's.* (Section B, page 17.)

3. After transitioning, in the area of Production Engineering,

TARADCOM will:

*Provide Engineering technical support to TARCOM as required.* (Section B, page 17.)

4. After transitioning, in the area of Configuration Management,

TARADCOM will:

*Serve as functional office for the Configuration Management Program. Process requests for changes/exceptions to Configuration Management policies for approval to DARCOM.* (Section B, page 19.)

5. After transitioning, in the area of Product Assurance, TARADCOM will:

> *Provide continuing product assurance and quality engineering support to TARCOM in the areas of expertise exclusive to TARADCOM. Provide support in the areas of key inspection, quality engineering and testing. Provide Quality Engineering Support as requested....* (Section B, page 22.)

6. Management responsibilities for product improvement are stated in the last section of the support agreement. The following extracts pertain to this study:

a. *PIPs which will result in substantial change in the performance envelope of the vehicle and are undertaken in lieu of designing a new item are the management responsibility of TARADCOM with the support of TARCOM.* (Paragraph IV.c., page 45.)

b. *Once management responsibility for weapons/equipment systems has transitioned to the Readiness Command, overall system responsibility will normally not be returned to the Development Command; however, TARCOM may determine that an improved version of a fielded system is the equivalent of a new developmental vehicle/component and should be managed by TARADCOM.* (Paragraph IV.d., page 45.)

c. *The developer of product improvements will be determined by the unique nature and extent of the change involved.* (Paragraph IV.e., page 45.)

d. *At the outset of each PIP project, the responsible command weapon system manager will negotiate an MOU with the other Command...based on the overall change requirements of the PIP. The following basic guidelines normally apply to modifications to fielded vehicles:...TARADCOM is responsible for design, testing, ILS planning, product assurance, assuring that the modification will work, and execution of those tasks assigned in the contract....* (Paragraph IV.f., page 46.)

## APPENDIX C

## GLOSSARY OF ACRONYMS

| | |
|---|---|
| AH-1 | Attack Helicopter-1 |
| AMARC | Army Materiel Acquisition Review Committee |
| AMC | US Army Materiel Command (now DARCOM) |
| AMS | Army Management Structure |
| AR | US Army Regulation |
| ARPRO | US Army Plant Representative Office |
| ARRADCOM | US Army Armament Research and Development Command |
| AVRADA | US Army Avionics Research and Development Activity |
| AVRADCOM | US Army Aviation Research and Development Command |
| CH-47 | Cargo Helicopter-47 |
| CORADCOM | US Army Communications Research and Development Command |
| DA | Department of the Army |
| DARCOM | US Army Materiel Development and Readiness Command |
| DMWR | Depot Maintenance Work Requirements |
| DOD | Department of Defense |
| ECOM | US Army Electronics Command (now ERADCOM, CERCOM and CORADCOM) |
| ECP | Engineering Change Proposal |
| ERADCOM | US Army Electronics Research and Development Command |
| FD&MO | Force Development and Management Office |
| FHMA | Family Housing Management Account |

| | |
|---|---|
| FY | Fiscal Year |
| GLD | Ground Laser Designator |
| GSRS | General Support Rocket System |
| ILS | Integrated Logistics Support |
| ILSO | Integrated Logistics Support Office |
| LDC | Logistics Data Center |
| LOH | Light Observation Helicopter |
| LOI | Letter of Instruction |
| LSAR | Logistics Support Analysis Record |
| MDC | Materiel Development Command |
| MERADCOM | US Army Mobility Equipment Research and Development Command |
| MICOM | US Army Missile Command |
| MIRADCOM | US Army Missile Research and Development Command (now MICOM) |
| MIRCOM | US Army Missile Materiel Readiness Command (now MICOM) |
| MRC | Materiel Readiness Command |
| MWO | Modification Work Order |
| NARADCOM | US Army Natick Research and Development Command |
| NMP | National Maintenance Point |
| O&M | Operation and Maintenance |
| OMA | Operation and Maintenance, Army |
| OM&F | Organization, Mission and Functions |
| ORSA | Operations Research/Systems Analysis |
| OV-1 | Observation Aircraft-1 (Fixed Wing) |

| | |
|---|---|
| PA | Procurement Appropriations |
| PAA | Procurement Appropriations, Army |
| P3 | Cost Code 738017.000P3, Organic Maintenance Engineering Services (Pre-Issue) |
| P7M | OMA Program 7, Maintenance |
| P7S | OMA Program 7, Supply |
| PAD | Product Assurance Directorate |
| PEP | Producibility Engineering and Planning |
| PIP | Product Improvement Program |
| PM | Project Manager |
| PMO | Project Management Office |
| Q1 | Cost Code 738017.000Q1, Organic Field Support Maintenance Engineering Services |
| Q3 | Cost Code 738017.000Q3, Organic Other Engineering and Analysis Services |
| QA | Quality Assurance |
| RAC | Reliability Analysis Center |
| RAM | Reliability, Availability, Maintainability |
| R&D | Research and Development |
| RDT&E | Research, Development, Test and Evaluation (used in DOD publications) |
| RDTE | Research, Development, Test and Evaluation (used in DA publications) |
| RDTEA | Research, Development, Test and Evaluation, Army |
| TARADCOM | US Army Tank-Automotive Research and Development Command |
| TARCOM | US Army Tank-Automotive Materiel Readiness Command |

| | |
|---|---|
| TDA | Table of Distribution and Allowances |
| TDP | Technical Data Package |
| TSARCOM | US Army Troop Support and Aviation Materiel Readiness Command |
| TSQ-73 | Ground Transportable Special Equipment Radar-73 (Missile Minder) |
| UH-1 | Utility Helicopter-1 |

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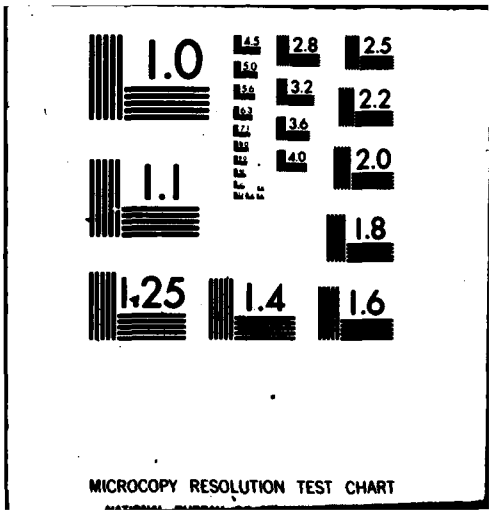
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APPENDIX D

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